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ABSTRACT

This annotated bibliography enables researchers who are using Raven's Progressive Matrices or the Mill Hill Vocabulary Scales to become familiar with other work that used these tests. The bibliography derives from Raven's own collection of sources, updated to the end of 1971. The major division of material is by tests rather than subject areas; however, indications are given when the major interest of a paper is in a particular field. The references are arranged in the following order: (1) Standard Progressive Matrices (SPM) with Mill Hill Vocabulary (MHV); (2) SPM Only; (3) Coloured Progressive Matrices (CPM); (4) Advanced Progressive Matrices (APM) (with or without Mill Hill Vocabulary); (5) Mill Hill Vocabulary Only; and (6) Other Combinations of These Tests. Each entry is coded to indicate the main interest of the material, such as: normative data, textbook description, anthropological interest, clinical interest, educational interest, and vocational interest. (DB)

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RESEARCHERS' BIBLIOGRAPHY
for
RAVEN'S PROGRESSIVE MATRICES
and MILL HILL VOCABULARY SCALES

compiled by
J. H. COURT

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FOR

RAVEN'S PROGRESSIVE MATRICES

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Introduction

This annotated bibliography has been prepared to enable research workers using Raven's Progressive Matrices or the Mill Hill Vocabulary Scales to become readily familiar with other work using these tests. Because they have been used in such varied settings, and work has been published in many different journals around the world, the task of conducting a literature search is a formidable one.

The present bibliography derives from Raven's own collection of sources, updated to the end of 1971. It is as near complete as possible, but the assistance of others who can supplement this list is invited in order to revise subsequent editions. The material is laid out in a form which will facilitate supplementary items being added periodically, and it is hoped to mail these to all who receive the initial document.

The ordering of material to enable workers to locate what they want easily has been attempted. The major division of material has had to be by tests rather than subject areas since the latter overlap too much. Nonetheless, indications are given when the major interest of a paper is in a particular field, e.g. clinical, anthropological. The absence of a coding does not suggest there is no relevance to a given area - only that it is not the major area.

The addition of summaries to the references should provide additional information which will reduce the likelihood of following up material which is irrelevant for a given topic. Many of the abstracts are taken directly from Psychological Abstracts, which source is gratefully

acknowledged. Summaries from articles themselves have been widely used also, but modified in some cases to indicate the use that has been made of the Matrices and Mill Hill Scales. Other summaries have been specially prepared, and these have been cast in a non-evaluative form.

Workers wishing to contribute further material to this bibliography or to recommend improvements in format are invited to write to the author. In addition, details of ongoing projects are invited so that a clearing-house service may be provided, linking workers with similar areas of interest.

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Terminology

Progressive Matrices has proved a title more apt than Raven envisaged when the term was introduced for the 1938 series. The literature relating to the Matrices has become increasingly confusing in recent years because they proved to be progressive in at least two senses beyond the original meaning of a developing series of problems each following from its predecessor.

For 30 years Raven continued to develop his tests. The initial series of Standard Progressive Matrices (1938) was followed by the Coloured Progressive Matrices (1947), thereby extending the range of usefulness down to include young children, old people and the mentally defective. A need to extend the Standard series at the upper end led to the development of the Advanced Progressive Matrices, prepared initially in 1941, but coming into restricted circulation in 1947. This progressive development has not always been realised by workers using one form of the test, and the term Progressive Matrices has therefore been used to refer without distinction to any of the three series.

A second progression has also produced some confusion. Each series has been the subject of revision in the light of accumulating research. The results of item-analyses have led to re-ordering of items, and studies with original Advanced series led to a shortening from 48 to 36 items. The consequence is that a convention of identifying the tests by date, e.g. "PM 1938" or "PM 47" is no longer a means of clarification. The Standard series was revised in 1956 and the Advanced series in 1962.

As a result PM 47 may refer either to the original Coloured series or to the first Advanced series to become available. Similarly, PM 56 might refer either to the revision of the Standard series or of the Coloured series.

These, together with other more idiosyncratic ways of referring to the tests, make it necessary to propose a convention which can be unambiguously adopted for the future.

The whole series should in future be referred to as Raven's Progressive Matrices (or RPM) when no further distinction is being made.

The Coloured series should in future be referred to as Coloured Progressive Matrices (or CPM).

The Standard series should in future be referred to as Standard Progressive Matrices (or SPM).

The Advanced series should in future be referred to as Advanced Progressive Matrices (or APM). (In the event of distinguishing the preparatory series of APM from the main series, these should be identified as APM I and APM II.)

The Mill Hill Vocabulary Scales has not been the source of confusion in the same way. However, authors rarely identify which forms of the test have been used. Since they have interchangeable Synonyms and Definitions, and are available in Junior and Senior forms, it is proposed that in future reference should be to the Mill Hill Vocabulary Scale (or MHV), or, where necessary, identified as MHV(Sen.1).MHV(Sen.2), MHV(Jun.1) or MHV (Jun.2).

Lay-Out of Bibliography

References are arranged in the following order.

1. SPM and MHV
2. SPM only
3. CPM
4. APM (with or without MHV)
5. MHV only
6. Other combinations of these tests

To the left, code letters indicate the main interest of the material.

N. Normative data

T. Textbook description

A. Anthropological interest

C. Clinical interest

E. Educational interest

V. Vocational interest

1. Standard Progressive Matrices (SPM) with Mill Hill Vocabulary (MHV)

BUROS, O.K. (Ed.) (1949) The Third Mental Measurements Yearbook. Rutgers U.P. New Brunswick.

Review of SPM by Walter C. Shipley and David Weschler:
Review of Mill Hill Vocabulary by David Weschler.

DAVIES, A.D.M. (1965) The Perceptual Maze Test in a Normal Population: Percept. and Motor Skills. 20. 287-293.

The paper reports the performance of a large sample of normal men and women on the Perceptual Maze Test of Elithorn, and relates this to other measures of intellectual functioning, personality measures and age. The correlation of PMT with SPM is higher than its correlation with MHV. The relationships found suggest that the PMT, like the SPM and MHV, measures some aspect of intellectual functioning.

C. DESAI, Mahesh M. (1960) Intelligence and Verbal Knowledge in Relation to Epstein's Overinclusion Test. J. Clin. Psychol. Vol. XVI, No. 4. 417-419.

Epstein's Overinclusion test, the P.M. Test and the Mill Hill Vocabulary (Synonyms) Test were given to 120 psychiatric cases with a diagnosis primarily of neurosis or personality disorder. The Pearson r's between intelligence level as assessed by Progressive Matrices verbal knowledge as assessed by Mill Hill Vocabulary and Overinclusion scores on the Epstein Test were determined. The relationships of intelligence and verbal knowledge to overinclusion scores were found to be negative and significant. The overinclusion scores of our population were discussed in relation to those of schizophrenic populations. The mean score of our non-psychotic sample was found to be higher than Epstein's cut-off score for normals and schizophrenics, and at least as high or higher than the scores of 61% of a sample of Admission Ward schizophrenics. The study points to the need for caution in the use of the Epstein test for differential diagnosis. The influence of intelligence, of verbal knowledge and neurotic or character disorders, need to be borne in mind in the interpretation of the Epstein test scores.

V. ELLIOTT, P.E. (1953) Analysis of Applicants' Test Scores. Pers. Comm.

Gives the mean scores of Matrices performances of accepted and rejected candidates in occupational selection. A study of 375 male applicants for jobs, ranging from labourers to research scientists, the bulk being clerical or skilled workers. This confirms Himmelweit's assumption that the differences in the vocabulary intelligence ratio are normally distributed. In a study of 35 girls (aged 16-19) training for shorthand work, Matrices had no correlation with shorthand level but had a 'g' loading of 0.73.

C. EYSENCK, H.J. Dimensions of Personality. Routledge and Kegan Paul Ltd. London. 1947.

Presents (in Ch. 4) the results of SPM given to 5000 male army neurotics, compared with the scores of 3665 men of similar age tested prior to starting military service. Slight differences in level with the neurotic scoring lower are considered to be unimportant and largely a function of the lower reliability of tests given to a neurotic population. A measure of scatter on SPM did not relate to measures of dysthymia or hysteria. Some personality differences did emerge when MHV and SPM results were compared together.

C. EYSENCK, M.D. An Exploratory Study of Mental Organisation in Senility. J. Neurol. Neurosurg. and Psychiat. 1945. Vol. VIII, Nos. I and II.

Twenty psychological tests were given individually to 84 senile dementia patients and repeated after 4/12, total testing time per patient being approximately 3-1/2 hours. The average age of the patients was 73.4 ± 6.5 years. Test-retest reliabilities were established for the tests used, and intercorrelations run between the tests. A factorial analysis was carried out on these intercorrelations in an attempt to throw some light on the type of mental organisation to be found in senility. Comparisons were made between the scores of normal adults and children on these tests. A comparison was also made between the scores on the tests of a 'superior' and an 'inferior' group of seniles, as determined by the level of the skill required in the work they had been doing in the course of their lives. Tests used included MHV and a broad form of PM using only the 24 items of Sets A and B.

C. FORREST, A.D., HAY, A.J. and KUSHNER, A.W. Studies in speech disorder in schizophrenia. Brit. J. Psychiat. 1969, 115, 833-841.

1. Some of the literature on schizophrenic speech disorder has been reviewed, and the question whether this phenomenon should be viewed as an organic defect or a biological defence has been discussed.

2. Transcripts from interviews with two schizophrenic patients have been presented to illuminate the differential response to "closed, concrete" questions and "open, abstract" questions.

3. The results of our attempt to replicate the work of Lawson et al. (1964) on ten "normal" and ten schizophrenic subjects have been reported. There was no significant difference as regards the effect of greater degrees of contextual constraint.

4. A verbal test aimed at discriminating between concrete and abstract responses was given to 25 "normals" and 22 schizophrenic subjects. The results suggested that the capacity to respond abstractly was related to intelligence, not to diagnostic category.

V. FOULDS, G.A. Variations in the Intellectual Activities of Adults. Amer. J. Psychol. 1949. Vol. 62. pp. 238-246.

To study normal changes with age in a person's capacity for intellectual activity and ability to recall information, a series of perceptual tests and a suitably constructed Vocabulary Scale have been given to representative groups of adults. Except that the rate of development and decline appears to be different at different intellectual levels, the results agree with the findings of other investigators. A person's capacity for intellectual activity appears to have reached its maximum by the age of 14, to remain constant for about ten years, and then to decline. The recall of information appears to increase up to about the age of 30 and remains relatively constant up to the age of 60.

C. FOULDS, G.A. The Relative Stability of Personality Measures Compared with Diagnostic Measures. J. Ment. Sci. 1959. 105: 783-7.

Previous results - indicating that certain test measures differentiated between the Hysteric and Dysthymic women, regardless of personality type whilst others differentiated between hysteroid and obsessive personalities regardless of diagnostic type - were confirmed on a second sample.

It was predicted that (1) diagnostic measures would change more than personality measures (2) the diagnostic measures of Dysthymics would change more than those of Hysterics in such a way that

(a) these groups would cease to be distinguishable on retest whereas

(b) hysteroid and obsessive personalities would be distinguishable both on test and retest.

All these predictions were correct.

C. FOULDS, G.A. Progressive Matrices and the Mill Hill Vocabulary Scale as a Diagnostic Aid Among Psychiatric Patients. Brit. J. Soc. Clin. Psychol. 1970. 9. 1. 80-82.

P.M. and M.H.V. given to patients of a hospital, divided into nine diagnostic groups. Results: M.H.V. (1) The six groups performing least well were all female. (2) In both sexes, hysterics performed best, followed by obsessionals and character disorders, but the worst were paranoid schizophrenics, among women, and psychotic depressives, among men.

P.M.: (1) Seven of the 8 worst groups were female - the four best were male. (2) In both sexes, obsessionals performed best, nonparanoid schizophrenics worst and paranoid schizophrenics next worst. The sex differences on both P.M. and M.H.V. in favour of men found by Foulds and Dixon (1963) among schizophrenics and neurotics are here found among all groups studies.

P.M. Time: Hysterics and character disorders spent least time on P.M. and obsessionals and psychotic depressives spent most. The juxtaposition of these two latter groups perhaps lends tangential support to Furneaux's (1960) Separation of speed and persistence.

M.H.V. : P.M. Ratio: The differences may prove to be more closely related to personality than to diagnosis among neurotics, though probably not among schizophrenics.

C. FOULDS, G.A., DIXON, Penelope, McCLELLAND, Marilyn and McCLELLAND, W.J. The Nature of Intellectual Deficit in Schizophrenia: Part II - A Cross-Sectional Study of Paranoid, Catatonic, Hebephrenic and Simple Schizophrenics. Brit. J. Soc. & Clin. Psychol. 1962, I, 141-9.

Progressive Matrices (1938) and Mill Hill Vocabulary scores of 270 schizophrenics were analysed in relation to sex, length of hospitalisation, age and diagnostic subgroup. Men were significantly superior to women in all subgroups on both tests. Hospitalisation period

contributed little to the results over and above its inevitable relationship with age. The negative relationship between PM scores and age was similar in schizophrenics and neurotics. This and other evidence led to the conclusion that impairment was nonprogressive and largely confined to the period between the onset of illness and first admission. Consistent differences were found between the subgroups independent of sex difference, catatonics showing the most differential impairment of intellectual ability.

C. FOULDS, G.A. and DIXON, Penelope. .The Nature of Intellectual Deficit in Schizophrenia. Part I: A Comparison of Schizophrenics and Neurotics. Brit. J. Soc. Clin. Psychol. 1962. I, 7-19.

Scores of schizophrenics on a test of general intellectual ability and on one of acquired information were compared with those of a group of neurotics, from the same locality with a similar age distribution. Schizophrenics were low scorers compared with the neurotics on the Progressive Matrices. On the Mill Hill Vocabulary Scale only female neurotics and schizophrenics could be differentiated. The large PM discrepancy between these two groups was taken as evidence of a considerable degree of intellectual deficit in the schizophrenics. This generalisation was justified by comparing the best subgroup - paranoids - with neurotics. This deficit could be attributed to the schizophrenia rather than to the differences in initial level, since MHV differences were smaller and less consistent.

C. FOULDS, G.A. and DIXON, Penelope. The Nature of Intellectual Deficit in Schizophrenia: Pt. III. A Longitudinal Study of the Sub-Groups. Brit. J. Soc. Clin. Psychol. 1965. I. 199-207. October.

186 of the original schizophrenics were retested on Progressive Matrices (1938) and the Mill Hill Vocabulary after a two year interval. Acute cases in all subgroups showed powers of recovery, particularly catatonics. The overall conclusions were that all types of schizophrenics showed intellectual impairment a reversible type of deficit, that this impairment was more or less completed by the time of first admission and that any further decrement was brought about by age, not by a progressive deficit and not mediated by hospitalisation or related to length of illness.

V. FOULDS, G.A. and RAVEN, J.C. Normal Changes in the Mental Abilities of Adults as Age Advances. J. Mental Sci. 1948. 94: 133-42.

1938 Progressive Matrices and Mill Hill Vocabulary Scale were administered to 1047 Engineers and 920 male employees of an industrial firm - 1 competitive and one non-competitive in situation. Rate of decline in Matrices Test is uniform from age 25 on; vocabulary scores show a constant rise to about age 30 with little decline to age 60. Concluded that average person's ability to form comparisons and reason by analogy increased rapidly during childhood, reaches its maximum at about age 14, remains constant to about age 25, and then declines constantly to age 60 and then more so to age 80 at which age average person can reason by analogy about as well as an 8 year old. Ability to recall information increases normally up to age 25 and remains constant for 25 to 30 years.

V. FOULDS, G.A. and RAVEN, J.C. Intellectual Ability and Occupational Grade. Occup. Psychol. 1948. 22: 197-203.

An employee sample of approximately 1000 male workers voluntarily took the Progressive Matrices and Mill Hill Vocabulary Scale. The tests agree in differentiating groups in different occupational levels, though there is some considerable overlapping. It was also shown that employees added during the war years have, on the whole, less mental ability than prewar employees.

GRAHAM, C. (1963) Differential Marking of Two Vocabulary Tests Psych. Rep. 12 (2) 421-22.

Differential marking of vocabulary tests with respect to the quality of response is examined. W.I.S.C. oral vocabulary test and Mill Hill (Definitions) written vocabulary test are compared to two other vocabulary tests and two ability tests (one of which was P.M.).

V.C. HAMILTON, Vernon. I.Q. Changes in Chronic Schizophrenia. Brit. J. Psychiat. 1963. 109: 642-8.

Intelligence changes in male schizophrenic patients undergoing differential therapeutic activity programmes are reported. Study was in two phases. A first six months phase in which three equated groups of patients took part in Workshop activity, occupational therapy or no special therapeutic programme and a second two year follow up period in which effects of normal industrial subcontract work was additionally assessed. P.M. and

Mill Hill were used in both phases. Findings indicate that postulated decline of intelligence in chronic schizophrenia can be halted as well as reversed particularly when patients are engaged in quasi or real industrial work. Possible reasons for the observed changes in available intellectual capacity are discussed as well as their implication for community resettlement.

C. HIMMELWEIT, H.T. The Intelligence-Vocabulary Ratio as a Measure of Temperament. J. Personality, 1945. 14: 93-105.

This provides experimental evidence that differential performance on a conceptual and on a vocabulary test of intelligence is related to temperament. Scores of 1821 male and 987 female neurotic patients at a mental hospital on P.M. and Mill Hill Vocabulary Test were used. Difference scores were calculated and case records of patients with high intelligence-vocabulary ratio were compared with those with low intelligence-vocabulary ratio. Former group had more patients with hysteric personality and latter more with anxiety states and/or depression. Latter were on the whole younger and of poorer education level. Data was reanalysed by equating the groups for age and education. Though certain differences were found, they applied equally to high and low intelligence groups . So separation into hysteric or anxious and depressed were not due to age or educational background but based on differential performance on the two tests. It appeared that anxious and depressed patients utilise their intellectual ability significantly more than hysterics.

C. HINTON, J. and WITHERS, E. The usefulness of clinical tests of the sensorium. Brit. J. Psychiat. 1971, 119 (548) 9-18.

Three forms of brief question and answer tests of mental efficiency used on 108 psychiatric and 40 nonpsychiatric patients showed positive correlations to MHV, SPM and the WAIS.

C. KEAR-COLWELL, J.J. The B Factor Scale of the 16PF as a Measure of Intelligence in Psychiatric Patients. J. Clin. Psychol. 1970. 26 (4). 477-479.

The Standard P.M., Mill Hill Vocabulary Scale and 16PF were given to a sample of 105 male and 105 female psychiatric patients to investigate the relationship between the B factor scale and general intelligence. The findings were that the B factor scale was a reasonably valid measure of general intelligence in

the female sample, but in the male sample the scale appeared to be a mixed measure of both verbal ability and general intelligence.

E. KEIR, Gertrude. The Progressive Matrices as Applied to School Children. Brit. J. Psychol. Stat. Sect. 1949. 2: 140-50.

A preliminary study of Matrix test has been completed with approximately 300 children whose ages range from 10-14. Reliability of test when used for children appears to be in the region of .70 and is thus even lower than its reliability with adults. Judged by its correlation with other tests, its validity is also lower than has been claimed. In regard to relative difficulty, test items are less evenly spaced than those of Binet scale. Test appears to contain too many items of medium difficulty. A factor analysis of intercorrelations between the items shows that test as a whole is more homogenous than the Binet scale, although its general factor contributes less to its total variance.

E. LYNN, R. and GORDON, I.E. The Relation of Neuroticism and Extraverson to Intelligence and Educational Attainment. Brit. J. Ed. Psychol. 1961. 31: 194-203.

Seven predictions concerning associations of neuroticism and introversion/extraversion with persistence, size of vocabulary and intelligence were derived from Eysenck's theory associating introversion and neuroticism with high academic achievement. Five of the predictions were verified at a statistically significant level - a. there was a positive correlation between introversion and persistence, b. between neuroticism and size of vocabulary, c. a curvilinear relation between neuroticism and score on Raven's Matrices. Subjects in the middle range of neuroticism doing best. d. & e. no significant correlation between either neuroticism or introversion and intelligence.

MONTGOMERY, G.W.G. The influence of verbal and non-verbal abilities on the attainment and occupational utilisation of concepts by the profoundly deaf. Paper presented to Intern. Research Seminar on the Vocational Rehabilitation of Deaf Persons, Washington, D.C., 1968.

An experimental study of cognitive processes using the S.O.N. Test of intelligence and concept attainment. 52 profoundly deaf adolescents were given the test in addition to nonverbal intelligence tests, tests of picture and abstract vocabulary and a speech test. SPM and MHV were in the battery. Concept attainment on the

S.O.N. Test is very significantly related to SPM.

V. MONTGOMERY, G.W.G. Cognitive ability and personality in the vocational adjustment of the profoundly deaf. Paper presented to IX International Congress of Audiology, London, 1968.

A study of the vocational adjustment of 99 young workers who are speech-handicapped due to early profound deafness. Each was tested by a comprehensive assembly of sensory, cognitive and personality tests and ratings during the last term at school. Two years later, follow-up was assessed in terms of occupational grade and turnover. SPM and MHV were among the battery used.

MONTGOMERY, G.W.G. A factorial study of communication and ability in deaf school leavers. Brit. J. Educ. Psychol., 1968, 38, 1, 27-37.

Seventy profoundly deaf school leavers were rated by their teachers for speech, lip-reading, written work and manual communication, and all but four of them were given a comprehensive battery of nineteen standardised tests of cognitive ability. SPM and MHV were included. Orthogonal factors of non-verbal reasoning, written vocabulary, numerical ability, manual communication and residual hearing were identified.

C. ORME, J.E. A Practical Guide to Estimating Intelligence, Attainments and Intellectual Deficit. Acta Psychologica. 1970. 32. 154-161.

This paper describes one way of systematically assessing ability, attainments and deficit. Useful and valid measures can be obtained which are economical in terms of time and tests used. At the same time, the methods utilised are ones which make it possible to deal with a wide range of age and ability. Paper aims to provide a short but comprehensive method of working in a basic area of psychological measurement. (Progressive Matrices form the basic method of measurement).

C. PAYNE, R.W. An Object Classification Test as a Measure of Overinclusiveness Thinking in Schizophrenic Patients. Brit. J. Soc. Clin. Psychol. 1962. 1. 213-221.

Results with the Object Classification Test are given for 120 normals, 34 neurotics, 20 endogenous depressives, 35 acute and 37 chronic schizophrenics. The correlation between 'A' response scores and P.M. is 0.62. Correlation of 'Non-A' with M.H.V. is 0.00.

N. PECK, David F. The Conversion of Progressive Matrices and Mill Hill Vocabulary Raw Scores into Deviation I.Q.s. J. Clin. Psychol. 1970 26(1), 67-70.

A method of converting Progressive Matrices and Mill Hill Vocabulary Raw Scores into deviation I.Q.s is presented.

E. PETERSEN, L. An investigation into the applicability of the norms associated with the Standard Progressive Matrices and the Mill Hill Vocabulary Scale for modern Australian testees. Honours Thesis, University of Adelaide, 1971.

SPM and MHV were administered to 138 High School students, consisting of a group of Matriculation students (mean age 17 years) and a group of Second Year students (mean age 14 years). An analysis of the tests provides evidence for significant discrepancies between the performance of this selected group and that provided in Raven's norms for the corresponding age groups.

Three comparisons were made -

(i) the mean scores for the tests relative to published means

(ii) correlation between scores on both tests relative to correlations cited by Raven.

(iii) frequency distributions of scores on each test relative to the normative distributions.

RAVEN, J.C. The Comparative Assessment of Intellectual Ability. Brit. J. Psychol. 1948. 39: 12-19.

Describes an attempt to trace normal changes in a persons's capacity to reason by analogy and in his recall of information as age advances. SPM and Mill Hill Vocabulary scale used. Approximately 8500 subjects between 4 and 65 years were tested, either individually or in groups on both tests. Author presents evidence from P.M. suggesting that "the capacity to form comparisons and reasons by analogy increases rapidly during childhood, appears to have reached a maximum somewhere about age of 14, stays relatively constant for about ten years and then begins to decline, slowly but with remarkable uniformity". Data from Mill Hill scale indicates "the average person's ability to recall information increases steadily up to age of about 25-27, remains almost constant for next 25 years, and then declines a little".

C. ROMNEY, D. Psychometrically Assessed Thought Disorder in Schizophrenic and Control Patients and in their Siblings and Parents. Brit. J. Psychiat. 1969. 115. 999-1002.

The tests of thought disorder (Lovibond's Object-Sorting Test and Bannister's Grid Test) and two intelligence tests (Mill Hill Vocabulary Scale and Raven's Matrices) were administered to 51 relatives of schizophrenic patients and to two control groups of 34 relatives of nonpsychiatric patients and 34 relatives of neurotic patients. Three groups were well matched for age, education and occupational status. Predicted that relatives of schizophrenics would be more thought disordered than relatives of neurotics or normals. Hypothesis was not confirmed on either test of thought disorder after effect of intelligence had been partialled out. Evidence however to suggest that had more subjects been tested it would have been confirmed. Schizophrenics' mothers were not found to be more disordered than the other relatives of schizophrenics.

V. SEMEONOFF, B. The Psychological Testing Programme at W.O.S.B.'s (officers). R.T.C. Technical Instruction F1/18. 1945.

Details of W.O.S.B. psychological testing - using the Progressive Matrices in a 20 minute and a 45 minute version, along with the Mill Hill Vocabulary Scale.

C. SMITH, S., THAKURDAS, H. and LAWES, T.G.G. Perceptual Isolation and Schizophrenia. J. Ment. Sci. 1961. Vol. 107, 450, 839-844.

1. Following upon experiences with normal volunteers, in a specially constructed silent room, we tried the effect of such isolation on six chronic or nuclear type schizophrenics.
2. Very few positive results were achieved and it is likely that such perceptual isolation has little or no effect on the withdrawal pattern so characteristic of schizophrenics under stress or anxiety.

C. THORPE, J.C. and BAKER, A.A. The Effects of Physical Treatment on Some Psychological Functions. J. Ment. Sci. 1958. 104. 865-9.

A series of schizophrenic patients was tested on a psychological battery including SPM and MPV before and after treatment involving E.C.T., insulin and Largactil. Improvements were apparent on both tests greater than expected through practice.

C. WALTON, D. and BLACK, D.A. The Validity of a Psychological Test of Brain Damage. Brit. J. Med. Psychol. 1957. 30, (4), 270-279.

The Modified Word Learning test - a learning task of relatively great difficulty, was used to try to differentiate between brain damaged and non-brain damaged patients. Subjects were 125 neurotic patients, 30 psychotics, 21 mental defectives and 46 brain damaged patients and 57 normals. Conclusions: although intelligence, vocabulary level and age exert some influence on test score, not sufficient to produce "organic" scores if no organicity present. When functional and organic subjects are matched simultaneously for age and scores on vocabulary test, no misclassifications occurred. The test appears capable of differentiating organics with general cortical damage from functionals and normals with a negligible degree of misclassification. Must be stressed that diagnosis of brain damage not in doubt and might be more difficult to pick out the much earlier case of dementia.

C. WELFORD, A.T. Psychological and Social Gerontology in Europe. J. Geront. 1958. Supplement No. 1, 13, 2, 51-67.

A survey of research in psychological and social gerontology in Europe. Mentions that P.M. has been used as an intelligence test for the aged and the most extensive study is that by Foulds and Raven. They found that whereas the Matrix scores fell with age, the vocabulary scores remained high and that the fall of the Matrix scores for less able subjects was greater than for the more able.

Also mentions studies by Halstead, Orme & Bromley using P.M.

2. Standard Progressive Matrices (SPM)

N. A.C.E.R.

Manual for Raven's 1938 Progressive Matrices

Educational Services Department,
Australian Council for Educational Research,
Hawthorn, Victoria. 1963.

E.A. AHTIK, Vitomir. A Statistical Analysis of Raven's Progressive Matrices Test, Form 1938. Unpublished manuscript, 1955.

An analysis of the Progressive Matrices (1938) results of 427 males, (aged 14.6 to 19.6) who were candidates for the first grade of a secondary school in Yugoslavia (Ljubljana). The mean was 34.0 (S.D. 12.3) with both a marked negative skew and a marked tendency to bimodality. The results include an item analysis showing a lack of discrimination by E12, C12, E8. Test reliability (split half method) is 0.959. Details are given of intercorrelations between the subtests and between the subtests and the whole.

T. AKHURST, B.A. Assessing Intellectual Ability. Teach Yourself Books, E.U.P., London, 1970.

A brief account for the elementary reader of the use made of SPM in showing the effects of maturation and aging on intellectual performance.

AMERIO, P. Componenti psicologiche dei fenomeni di "irrealta": Evidenziati in esperienze di livello di aspirazione: Contributi sperimentall. (Psychological components of the phenomena of unreality: Evidenced in experiments of the level of aspiration: Experimental contribution). Bollettino di Psicologia Applicata, 1968, 88-90, 63-72.

Studied the psychological meaning of N. Cassel's "unreality" by means of its concurrence with other types of variables, and sought a new experimental contribution to the problem of affective and emotional factors on the perceptive and cognitive activity. 104 16-yr-old students were given Cassel's Group Level of Aspiration Test (CGAT) and P. Amerio's Color Naming after being given R. Cattell's Scale of Anxiety, EPPS, and Raven's Progressive Matrices test. It is concluded that this study confirms Cassel's phenomena of unreality. 2 types of personalities emerge from the CGAT: 1 type has high but realistic aspirations and is an individual who is sure of himself. The other, too, has high aspirations but not in proportion to his potential; he is insecure, anxious, and incapable of valid human relationships on an affective level. The interference of emotional factors on the cognitive level occurs at the moment of decision.

E. AURIN, Kurt. (1966) Beganungsbestand und Bedingungsfaktoren der Bildungsbereitschaft. ("Potential Ability and Factors Influencing Educational Readiness"). In F. Merz (Ed.) Bericht über den 25. Kongress der deutschen Gesellschaft für Psychologie Munster. pp 29-40.

To ascertain potential ability and educational readiness of students in 61 German townships, 1143 students from the elementary school to the university level were tested. The test battery included a vocabulary test, the Culture Free Intelligence Test, Raven's Progressive Matrices, House-Tree-Person Test, an essay, the Wartegg-Sacher Characterological Intelligence Test, Horn's Achievement Test and Horn's Reasoning Factor Subtest. 28 test variables were present. Significant correlations appeared between (1) school grades and the combined profiles of the achievement test and the reasoning factor test (2) grades in mathematics and the reasoning factor subtest (3) German grades and the word fluency subtest and (4) achievement and social status.

V. BANNISTER, D., SLATER, P. and RADZAN, M. The Use of Cognitive Tests in Nursing Candidate Selection. Occup. Psychol. 1962. 36. 1-2. 75-81.

Reports results on GNC exams and P.M. in nurse selection. The value of P.M. in a selection procedure is emphasised when foreign students are being considered. In order to test the efficiency of the tests in predicting success in State exams, a tetrachoric r was calculated for P.M. r = .85; for GNC, r = .38.

BARRATT, Ernest S. The Relationship of the Progressive Matrices (1938) and the Columbia Mental Maturity Scale to the W.I.S.C. J. Consult. Psychol. 1956. 20: 294-6.

Columbia Mental Maturity Scale (CMMS) and Progressive Matrices (1938) were related to W.I.S.C. 74 fourth grade children were tested. Both P.M. and CMMS were significantly related to the W.I.S.C. total, verbal and performance scales. P.M. had more variance in common with W.I.S.C. total score than CMMS. Relationship of the P.M. and CMMS to the W.I.S.C. subtests was also discussed.

BARRATT, P.E.H. Imagery and thinking. Aust. J. Psychol. 1953, 5, 154-164.

During an investigation of 23 tests having spatial loadings, it was decided to attempt to relate quality of performance on the tests and ratings of the extent, use and facility of visual imagery. Results indicate

that those who rated the spatial-manipulation tests high obtained higher test scores on the average on these tests. Differences were significant. Those who rated the spatial-reasoning tests high showed no advantage over low raters. The results for the third factor - spatial recognition - are indeterminate. SPM loaded on Factors II and III.

BARRATT, P.E.H. The Role of Factors in Ability Theory. Aust. J. Psychology. 1956, 8, 2, 93-105.

A factor analysis of a series of 23 tests all having a spatial component revealed three factors. A factor labelled reasoning included SPM. However, SPM also loaded on an unexpected factor with contributions from tests loading on both Factor I and Factor II. This Factor III, 'the subject does not have to concern himself with variations of size or basic shape of the visual pattern but only with the position into which a constant shape has been manipulated'.

BANKS, Charlotte and SINHA, Uma. An Item Analysis of the Progressive Matrices Test. Brit. J. Psychol. Stat. Sect. 1951. 4: 91-4.

Raven's 1938 version of the "Progressive Matrices" test, with other tests of intelligence, has been applied to 310 children, age 8-13, and the results subjected to a statistical analysis. Average reliability of the Matrices was found to be 0.88. Average validity, whether judged by internal or external criteria, was 0.54. An item analysis based on biserial correlations showed that the validity of the separate items varied widely, averaging only 0.45. If the poorest was eliminated, it could probably be raised to at least 0.65. Although the test appears unquestionably promising, it can be improved.

A. BEMELMANS, F. L'analyse clinique des aptitudes par les tests. Bulletin d'Orientation scolaire et professionale. 1970. 19, 24-29.

If one takes two identical scores (total) by different subjects, it can be shown that they arise from different items and, consequently, involve different mental processes. With long experience of Piaget's tests, one may compare various interpretations and identify the operational structure of a given age. A study is reported in which PM 38 was given to 371 9 year olds, 534 10 year olds and 575 11 year olds and 457 12 year olds (in Quebec). Correct answers and errors for each age group were correlated with total score and scholastic level.

BINGHAM, W.C., BURKE, H.R., and MURRAY, S. Raven's Progressive Matrices: Construct Validity. J. Psychol. 1966. 62. 205-209.

(Also published as a chapter in "Readings in Clinical Psychology". Savage, R.D. (Ed.) Pergamon Press. 1966.

Analysis of the intercorrelations of scores by 39 unselected veterans on Raven's Progressive Matrices (P.M.), the W.A.I.S., Cohen's W.A.I.S. factors, the Army General Classification Test and age, suggest that P.M. measures principally a common general factor of intelligence functioning; that P.M. is not more related to Cohen's W.A.I.S. factor B (perceptual organisation) than to his factor A (verbal comprehension) but is probably related to both through an underlying general factor, and that P.M. is not clearly related inversely to age, within the age range of the subjects.

C. BLAZSANUIK, J. Clinical Diagnostic Use of P.M. 38 and Verbal Tests. Austral. J. Psychol. Res. 1962, 3: 5-8.

A hypothesis that the correlation between PM and Otis Test falls in the presence of emotional disturbance was tested using two school groups. The Szondi Test was used to assess emotional adjustment. The style of the paper makes it difficult to know whether the hypothesis was confirmed.

BOLIN, Byron J. A Comparison of Raven's Progressive Matrices (1938) with the A.C.E. Psychological Examination and the Otis Gamma Mental Ability Test. J. Consult. Psychol. 1955. 19: 400.

To find (a) what function the P.M. samples (by comparing it with test of homogenous items) and (b) degree of equivalence between P.M. and standard scales of general intelligence, two tests were used: American Council on Education Psychological Examination for College Freshmen (A.C.E.) and Otis Gamma Mental Ability Test. 76 junior college students were given the three tests. Mean age was 18.7 years and there were 72 females and four males. Figures for central tendency and correlation are given. Low P.M. - A.C.E. L(linguistic) correlation supports opinion that P.M. test best measures nonlinguistic areas of intelligence. The P.M. alone appears unsuitable for assessing "original endowment" in clinical cases but possibly useful in estimating loss.

E. BOLTON, Floyd B. Experiments with the Raven Progressive Matrices 1938. J. Ed. Res. 1955. 48: 629-33.

Data resulting from rather extensive experimentation using Progressive Matrices with school children suggest

that the test has significant correlation ranging from .40 to .58 with accepted measures of intelligence, that it can be administered with a time limit (35 minute suggested) without reducing reliability; and that it is possible to derive useable I.Q.s from raw scores on the test. It did not, however, prove to be a useful predictor of scholastic achievement at the 4th grade level.

C. BORZOVA, Eva (1967-1968). Problemt psychickeho vyvinu deti v podmienkach alkoholikej rodiny. (Problems of Mental Development of Children in the Alcoholic Family). Psychologia a Patopsychologia Dietata. 1967-68. 3 (2) 153-160.

Analyses results of psychological examinations and re-education proceedings with 51 6-14 year old subjects (29 boys and 22 girls) from alcoholic families who attended a re-educational camp for one month. Psychological examination consisted of intelligence tests (Terman Stanford Revision and P.M.) neuroticism questionnaire and interview. In the course of re-education, subjects participated twice a week in collective psychoterapeutic sessions. Results of psychological examinations show greater incidence of neurotic symptoms in these subjects and lowered intelligence level. In their emotional life, they show strong attachment toward abstinent mother and minimal or no positive relation to alcoholic father (82% of all cases). Control examinations at end of re-educational period showed slight regression of the neurotic symptoms. (Paper in Polish: English summary).

E. BOYD, Maynard E., and WARD, George. A Factor Analysis of the D48. Proc. West Virginia Academy of Science. 1966. 38. 201-204.

The D48, seven 'pure factor' tests, the Otis and S.P.M. were administered to 231 college students. The resulting correlation matrix was subjected to a Principal Axis Factor Analysis. In factor structure the D48 did not include Perceptual Speed, is more similar to the Otis than the Raven, and is more complex than the Raven.

E. BOYD, Maynard E. and WARD, G. Validities of the D.48 for use with College Students. Educ. Psychol. Meas. 1967. 27(4) 1137-1138.

The D.48, a nonverbal general mental ability test was evaluated for use with college students in comparison with the A.C.T., Otis and P.M. No differences in D.48 scores were related to sex, and the reliability estimate compared favourably with that of the Otis. For efficiency in predicting semester grade point averages, the D.48 ranked below the A.C.T. and Otis but above the Raven.

C. BRADFORD, E.J.G. Performance Tests in the Diagnosis of Mental Deficiency. Brit. J. Med. Psychol. 1943. 19: 394-414. Pts. 3-4.

Population tested consisted of 294 men maladjusted to army life and discipline whose Progressive Matrices score was below 39, i.e. in lowest 25% of population. Half were diagnosed as mentally defective, half as neurotic with a sprinkling of psychopaths, epileptics, psychotics and post-concussional cases. Performance tests used were Alexander's Passalong, Kohs' Designs, Knox Cubes, all modified in timing and scoring, and a new series of Graded Form Boards. Detailed instructions are given and the form board diagrams reproduced. Value of performance test is affirmed. They are useful for diagnostic purposes in general and are of value in differentiating the intellectual defective from the personality defective.

C. BROMLEY, D.B. Primitive Forms of Response to the Matrices Test. J. Ment. Sci. (1953). 99, 374-393.

In view of the 'levels' theory of cognition, the Matrices performances of 35 psychiatric cases are examined. It is concluded that although the test is effective in measuring abstract intelligence, it only gives a crude picture of the more primitive levels of intelligence.

E. BRUNI, Piero. Uno Studio sulle possibilita del D.48 nella scuola media. (A Study of the Application of the D.48 in Secondary School). Bolletino di Psicologia Applicata. 1966. 77-78, 157-169.

The D.48 test of general intelligence was administered to 234 male and 198 female 11-15 year old secondary school students to consider various aspects of the test's validity. Findings reveal that: (1) an increase in execution time from 25-45 minutes improves discriminative capacity of test, (2) the D.48 has a .67 correlation with P.M. 38, with minimal fluctuations for subjects in this age group and from one group to another, (3) the influence of cultural level is not clearly defined - minimal with respect to family environment and high when applied to scholastic matters, (4) the D.48 is highly correlated with scholastic success in mathematics, and inconsistent where Italian and Latin are are concerned. Concluded that the D.48 at secondary school level has ample validity comparable to that at higher cultural levels, and that further research is required to determine the dependence of the results on level of motivation. (Text in Italian).

V. BUCKLOW, Maxine, and DOUGHTY, Patricia. The Use of Aptitude Tests in Clerical Employment: The Selection of Accounting Machinists Personnel Pract. B. 1959. 13:35-44.

In selecting female bookkeeping machine operators for a bank, the A.C.E.R. Checking and Numbers tests were found most useful. N=53 and 44 for two groups. The criterion was supervisor's ratings. The 5% level of confidence was satisfied. (Other tests used were A.C.E.R., Word Knowledge (form B), Progressive Matrices 1938 (using timed subtests) and a five minute Arithmetic test constructed by A.C.E.R.).

C. BUDOFF, Milton. Learning Potential Among Institutionalised Young Adult Retardates Amer. J. Ment. Def. 1967. 72 (3) 404-411.

Budoff-Friedman study (1964) of learning potential (LP) with institutionalised young adult retardates was replicated. Subjects whose scores following coaching were remarkedly higher (gainers) were compared with those whose scores remained unchanged (nongainers). There were no differences between the groups in Stanford Binet or Wechsler V I.Q.s. Gainer's scores on Wechsler P I.Q., Raven's Matrices and on problem solving and learning tasks were higher. Chronological age was uncorrelated with LP status. Gainers tend to have been adjudged neglected or behaviour problems: their parents tend to have a higher incidence of convictions for criminal offences.

BURKE, H.R. AND BINGHAM, W.C. Raven's Progressive Matrices: More on Construct Validity. J. Psychology. 1969. 72. 247-251.

A. The untimed Matrices showed a surprising split half corrected reliability coefficient of .96 (N=91). B. Both a principal component and a Varimax factor analysis indicated that the Matrices loaded significantly on a factor of general intellectual functioning, even when it was heavily determined by verbal content. C. Performance on the Matrices was negatively related to age.

A. BURNETT, A., BEACH, H.D. AND SULLIVAN, A.M. Intelligence in a Restricted Environment Canad. Psychologist. 1963. 4:126-36.

An assessment of the adequacy of different measures of intelligence for inhabitants of isolated Newfoundland outports, the findings being related

to the environmental and social conditions in which these people live. Those living in the outports took longer than those from the centres, but when given all the time they wished, grade 10 students achieved scores on SPM equivalent to the UK normative sample ... the findings on SPM indicate that the 'intelligence' of outport people is normal.

BUROS, O.K. (Ed.) The Nineteen-Forty Mental Measurements Year Book. Highland Park, New Jersey. 1941. (Review of SPM by T.J. Keating).

E. CANTWELL, Zita M. Relationships between Scores on the Standard Progressive Matrices (1938) and on the D.48 Test of Nonverbal Intelligence and Three Measures of Academic Achievement J. Experim. Educ. 1966. 34 (4) 28-31.

Investigated the relationship between scores on P.M., the D.48 test of nonverbal intelligence and three indices of academic performance; namely the College Entrance Examination Board, Scholastic Aptitude Test (SAT) Verbal and Mathematics subtests and high school grade point averages. Scores were obtained for 139 freshmen at a midwestern women's college. Coefficients of correlation among the scores on the five measures were computed. Neither P.M. nor D.48 test could be identified as a highly valid indicator of general academic achievement, and neither appeared to be strongly related to performance on the SAT - Mathematics test. Accordingly, the former two tests appear to merit further study to determine what specific factor(s) each measures and to determine to what extent the total score on each test reflects learned problem-solving techniques or other learned behaviour patterns.

E. CARLSON, Jerry S. A Note on the Relationships Between the Draw-a-Man Test, the Progressive Matrices Test and Conservation. J. Psychology. 1970. 74 (2) 231-235.

The DAM, Standard P.M. and conservation of mass and weight tests were individually administered to 221 children aged $5\frac{1}{2}$ to $9\frac{1}{2}$. DAM and SPM are highly correlated and differentially related to conservation. The SPM was found to be significantly associated with conservation after the variance shared with the DAM was removed. The DAM, on the other hand, failed to be significantly related to conservation after this variance was removed.

C. CASSEL. Robert H. Qualitative Evaluation of the Progressive Matrices Test. Ed. & Psychol. Meas. 1949. 9 : 233-41.

Brief description of Progressive Matrices Tests given. Was observed that incorrect responses of mental deficient subjects to these tests often fall into certain patterns and possible response patterns were proposed. Examination of results of 33 mentally deficient subjects on these tests revealed that incorrect responses of some subjects fell into patterns, of other subjects only partially fell into patterns and of yet other subjects fell into no pattern. Was suggested that these incorrect response patterns might be evidences of maturational levels, that they might show aetiological differences and that they might help to answer question of why a subject at some point in the test quits trying. Also suggested that further research with a larger sample and control of variables would prove worthwhile.

CASTETTER, Joellen S. An Empirical Investigation of the Item Characteristics, Validity and Reliability of Raven's Progressive Matrices Test (1938) Master's thesis, Indiana University (Bloomington, Ind.). 1956.

E. CATE, Clarence C. Test Behaviour of ESL Students Calif. J. Educ. Research. 1967. 18 (4) 184-187.

A special study was made during the summer session with a sampling of students enrolled in ESL (English as second language) classes in an attempt to find out about student behaviour as it related to several group ability tests and to the performance portion of an individual test, e.g. WISC or WAIS". Four nonverbal tests were used, Tests of General Ability, Raven Progressive Matrices, Cattell Culture Fair Test, Scale 2, and a verbal test in Spanish, Test Rapido Barranguilla. Results indicate that the WISC performance scale or WAIS can be effectively used with ESL students.

A. CENTRE D'Etude Professionelle (Centre d'Orientation Professionelle at Leopoldville). Etude sur le P.M. de Raven. Mimeographed, Leopoldville, 1958. (see Irvine, Brit. J. Educ. Psychol. 1966. 36 (1) 32).

E. CHAUFFARD, C. Rigidite ou plasticite des aptitudes chez l'enfant. Enfance. 1949. 202-221.

Discordances are studied between results obtained with the vocabulary test (Binois and Pichot) and those obtained with the Matrix test of Penrose and Raven, when administered to 1,124 children, boys and girls from 9 to 14 in the Paris area, attending either the public schools or the lyceums. Significant differences between boys and girls and between pupils in the two types of school were revealed. Age differences were not significant. Correlations between the two tests and school grades were low. Correlations between the two tests themselves in public schools was .50 and in the lyceums .35.

CLARK, P.J., VANDENBERG, S.G. and PROCTOR, C.H. On the Relationship of Scores on Certain Psychological Tests with a number of Anthropometric Characters and Birth order in Twins. Hum. Biol. 1961. 33: 163-80.

A positive correlation is reported between scores on tests of cognitive skills and head size in monozygous and like-sexed dizygous twins. For the former, the relationship is significant at the 5% level, for the latter it is not significant. A positive correlation (1% level) is reported between cognitive skill scores (Chicago Test) and birth order in dizygous twins with the higher score usually being obtained by the first born co-twin.

COATES, G.D. and ALLUISI, E.A. Reliability and correlates of a three-phase code transformation task. (3P-COTRAN) Percept. Mot. Skills, 1971, 32, 971-985.

A factor analysis of 75 measures led to the identification of 8 factors derived from 84 Ss solving 6 blocks of three problems and completing 6 hrs of paper and pencil tests, including SPM. Five of the factors represent 3P-COTRAN performances, 1 verbal intelligence and 2 personality characteristics. Nonverbal intelligence, as measured by SPM is related to 3P-COTRAN performance.

C. COLONNA, A. and FAGLIONI, P. The Performance of Hemisphere-Damaged Patients on Spatial Intelligence Tests. Cortex. 1966. 2. 293-307.

Evaluated two spatial intelligence tests (Elithorn's Perceptual Maze Test - PMT and Raven's Progressive Matrices) on 1[illegible] right handed patients with unilateral right and left hemispheric lesions. Analysis of covariance revealed no significant difference between the test

performance of the two hemispheric groups. Right brain damaged patients performed worse than left brain damaged patients on the PMT, but any significant difference disappeared when scores were adjusted for visual reaction times, which were slower in the right brain damaged group. Aphasics performed worse than nonaphasic left brain damaged patients on both tests while patients with visual field defects performed worse than those without visual field defects on the PMT only.

CRAWFORD, Agnes. An Analysis of Children's Wrong Answers on Raven's Progressive Matrices Test 1938. Proceedings: Annual Conference, B.P.S., Durham. 1955.

An analysis of children's wrong answers, demonstrating that children who have only low scores on the whole test are those who tend to persist in choosing part of the Matrix for their answer - a principle appropriate in the early part of the test, but not in the later. Conversely, children whom despite the presence of parts of the matrix in the multiple choices, found the evidence of the matrix itself outweighed this rigid procedure.

A.V. CROOKES, T.G., and FRENCH, J.G. Intelligence and Wastage of Student Mental Nurses. Occup. Psychol. 1961. 35: 149-54.

Progress of 136 student mental nurses, up to passing their final examination or leaving without doing so, were examined in relation to their score on Raven's P.M. (1938) untimed. Found that score correlated quite highly with examination success but not with eventual completion of course. When divided into three groups, Home, West Indian and non-English speaking, all showed positive correlation between Matrices and completion of the course, the others showed a small negative correlation. When reasons for leaving were considered, those who left because they were considered unsuitable by the hospital were predominantly of low Matrices score; those who chose to leave tended to have high scores.

C. CULTON G.L. Spontaneous Recovery from Aphasia. Doctoral thesis, University of Denver. 1968.

Two groups of 'recent' and 'stable' aphasics were compared on language functions and with SPM, testing being repeated after a six week interval. Comparison of scores of recent aphasics demonstrated a general relationship between the severity of aphasia and intellectual function. Subjects with recent aphasias scored lower on the Raven test when severely aphasic and higher on the Raven test when mildly aphasic.

E. DASH, S.C. and KANUNGA, R. Progressive Matrices and School Success: A Factor Analytical Study. Psychologia. 1959. 2: 246-50.

> Progressive Matrices scores and average marks of three successive school examinations in Mathematics, Language, History, Science, General Knowledge and Aggregate, obtained by a group of 100 students of the top matriculation class were inter-correlated ... and then factor analysed by the centroid method. The results .. suggest that nonverbal intelligence plays a major role for success in all the subjects except History.

C. DAVIDSON, Marsh. Studies in the Application of Mental Tests to Psychotic Patients. Brit. J. Med. Psychol. 1939. 18: 44-52. Part I.

> Previous findings are confirmed, showing that schizophrenics produce vocabulary scores significantly higher than scores on other items of the mental test. Analysis of perceptual tests showed little difference between schizophrenic, manic depressive and other groups, except in the nature of the errors made on one of the tests. The schizophrenics showed a preference for alternatives in which one or more elements of the original matrix were combined.

DAVIES, Ann D.M. and DAVIES, M.G. The Difficulty and Graded Scoring of Elithorn's Perceptual Maze Test. Brit. J. Psychol. 1965. 56. 295-302.

> A discussion of levels of difficulty of the mazes is related to scores on SPM, with correlations ranging between 0.52 and 0.62.

DEBYSER, R. and JENNEN, J. Une batterie de tests d'intelligence destinée à des étudiants du niveau de l'enseignement supérieur. ("A battery of intelligence tests for college students"). Information Psychologique. 1969. 34. 39-80.

> Eight tests, including the Progressive Matrices and the Dominoes Test, were administered to 111 students at the Royal Military School, Brussels, Belgium. Means, standard deviations and inter-correlations are reported as well as the results of factor analyses. Correlations with school success are not reported.

N. DELYS, L. Normes du test Matrix 1938 à l'Armée belge de 1946 à 1951. Revue belge de Psychol. et Pedag. 1953, 15, 13-16.

C. DE RENZI, Ennio and FAGLIONI, Pietro. The Comparative Efficiency of Intelligence and Vigilance Tests in Detecting Hemispheric Cerebral Damage. Cortex. 1965. 1. 410-431.

Application was investigated of vigilance tests to cases of focal lesions in brain damaged (N=166) and control patients (N=130). Performances of subjects on intelligence test (Raven's Matrices 1938) and in two vigilance tests (Visual Reaction) were compared. Two vigilance tests showed great efficiency in discriminating between normal and pathological subjects than P.M. if educational level was not taken into account, this difference disappeared when specific criteria of discrimination, based on year of schooling, were applied. Discrepancy between number of subjects classified, correctly and incorrectly with single and specific threshold methods was greater with Matrices than with vigilance tests. In comparison of aphasic vs. nonaphasic and left-sided vs. right-sided patients, there were no differences in the performances on PM.

C. DESAI, Mahesh. The Test-Retest Reliability of Progressive Matrices Test. Brit. J. Med. Psychol. 1952. 25:48-53. Pt.I.

300 male psychiatric cases at the Belmont Hospital were tested twice with Raven's Progressive Matrices test at an interval of four weeks and the test-retest reliability was calculated. The product moment coefficient of correlation between two sets of scores was found to be 0.737 ± .27 S.E. A significant rise in the mean score was observed on retest. The implications of the changes observed are discussed.

C. DESAI, Mahesh M. The Relationship of the Wechsler-Bellevue Verbal Scale and the Progressive Matrices Tes. Abstract J. Consult. Psychol. 1955. 19:60.

Subjects were 190 consecutive male admissions to the hospital and were given P.M. and three or more tests of Wechsler-Bellevue Verbal Scale (120 had all 6 tests; Mean age 31.7 years.) Socioeconomic class was lower-middle or working class. There were 121 neurotics, 30 psychopaths, 13 organics, 9 early schizophrenics and 19 miscellaneous. Product moment correlation was .573 (when corrected for attenuation was .648). Overall r not as high as might be expected. Perhaps due to relatively lower reliability of P.M. in psychiatric cases.

DEUTSCH, Martin, KATZ, Irwin AND JENSEN, Arthur R. Social Class, Race and Psychological Development. Holt, Rinehart and Winston. 1968. (See Ch.4. Social Class and Verbal Learning by A.R. Jensen).

Discusses the proposition that successful performance on intelligence tests, and especially so-called nonverbal tests, requires spontaneous verbalisation on the part of the subject. This is then related to differences found between white and nonwhite populations.

A. DEWAAY, G. Contribution a l'etude du Progressive Matrices 1938 de Raven . Centre Pilote d'orientation Professionelle de Leopoldville. March. Unpublished manuscript. 1959.

An introduction (in French) to the value of SPM as a nonverbal intelligence test in the Congo, particularly because of its ease of administration. Data relating to its use with 1984 subjects are reported.

V. DI FIORE AND RENDA S. Etude sur l'applicabilite de quelques tests en orientation professionelle. (Study of the applicability of several tests in vocational guidance). Bulletin de Psychologie Scolaire et d'Orientation. 1969. 18 (4), 257-271.

Administered 1938 PM, Revised Minnesota Paper Form Board Test (MPFB), an observation capacity test (OC), a task performance (TP) and a number operations (NO) test to 1560 apprentices and college students. Statistically significant differences in performance were noted in relation to (a) age only for the OC, TP and NO tests, (b) length of schooling for all tests (c) sex only for MPFB and NO tests.

When the 5 tests were administered to 200 apprentices of homogeneous age and years of schooling, correlation coefficients showed that the PM38 correlated highly with MPFB and the task performance TP. Also number of aptitudes revealed by this battery is limited, the latter lacking factors e.g. intelligence structure. Factor M, Factor W and the mechanical factor. These factors added to the battery, increase its usefulness as to prognosis of performance and profiting of intellectual qualities.

E. DOSAJH, N.L. Progressive Matrices as a Tool for Diversification at Hr. Sec. Level Punjab Education Quarterly. 1958.

C. DOWIS, James L. AND BUCHANAN, Charles E. "Some Relationships between Intellectual Efficiency and the Severity of Psychiatric Illness". J. of Psychol. 1961. 51, 371-381.

A group of 75 psychiatric patients was measured on two occasions with P.M. and W.R.V.T. - once during maximal and once during minimal behavioural pathology. An increase in the severity of pathology was associated with a deficit in the efficiency of intellectual functioning. In addition, there was a significant loss noted in nonverbal modes of cognition (P.M.) while verbal efficiency (W.R.V.T.) remains relatively unchanged.

V. EDHOLM, O.G. AND GIBSON, A.H. Examination Results and and Intelligence Test Lancet. 1944. August 26th. p. 294.

Selection of medical students at Belfast: The Matrices results of students in the second year (for three years running) were compared with their examination results. (1st year - unlimited time. 2nd and third years - 20 minute version). Only a slight correlation was found with terminal class exams in physiology, and similarly with the rest of the 1st M.B. exam. Probably the low correlation is due to the relative homogenity of the group - a fairly rigid process of selection has already been applied by the time the student reaches his second year.

C. EDWARDS, Allen. E., AND WINE, David B. 'Personality Changes with Age: Their Dependency on Concomitant Intellectual Decline J. Gerontol. 1963. 18:182-4.

Personality and biographical variables were related to the intelligence levels of 80 males, ranging in age from 22-76 years . Of 41 variables, 14 were significantly correlated with age. However, when intelligence was made co-variate, 6 variables were significant with the covariance analysis.

C. EISENTHAL, S. AND HARFORD, T. Correlation between the Raven Progressive Matrices Scale and the Shipley Institute of Living Scale. J. Clin. Psychol. 1971. 27 (2) 213-215.

This research compared the Shipley Institute of Living Scale and P.M. Both tests were presented in random order to 100 neuropsychiatric patients. Comparisons were made between total number of correct answers on P.M. with following scores of the Shipley: Total Mental Age, Abstraction Age, Vocabulary Age and Conceptual Quotient. In comparing the two scales, attention was drawn to mental deterioration, socioeconomic status, age and diagnosis. Results indicated substantial correlations between the two scales, but they were not sufficiently similar to be interchangeable. The Shipley measures sensitive to intellectual impairment, C.Q. and Abstraction age assigned more than twice as many patients to an impaired category as did the P.M. The expected culture fair quality of P.M. was not demonstrated, it correlated significantly with socioeconomic status and at about the same level as did Shipley TMA score. P.M. and Shipley measures correlated with age and neither test significantly differentiated diagnostic categories.

A.E. ELLEY, W.B. AND MACARTHUR, R.S. The Standard Progressive Matrices as a Culture-Reduced Measure of General Intellectual Ability Alberta J. Ed. Res. 1962. 8:54-65.

For a representative sample of 271 Edmonton Grade VII pupils, Standard Progressive Matrices (1956) was found to: correlate significantly less with socioeconomic status than C.T.M.M.-Language, have a high loading of .78 on a general intellectual ability factor and no loading on group factors emerging from the tests used, have a moderate relationship with school marks (.56) and achievement tests (.38 to .44) have reliability (internal consistency) of .87 and was as stable and predictive of school marks from Grades III to VII as the C.T.M.M.

EMMETT, W.G. Evidence of a Space Factor at 11+ and Earlier. Brit. J. Psychol. Stat. Sect. 1949. Vol. II. Pt. I. 3-16.

Using D.N. Lawley's Maximum Likelihood Method of factor analysis, the writer establishes evidence for a space factor at 11+ and earlier. The Matrices test constituted one of a battery of tests included in the enquiry, showing a high 'g' saturation, but here no 'v' or 'k' factor.

EPPS, P. A preliminary survey of 300 female delinquents in Borstal institutions. Brit. J. Delinquency, 1951, 1, 3, 187-197.

A medico-psychological survey of 300 Borstal girls, 289 of whom were given SPM.134 of these scored below Grade III and 11 scored above Grade III. A group of 102 girls who were prostitutes showed a similar distribution of intelligence.

A.E. ERPICUM D. Tests Mentaux et Resultats Scolaires Chez Des Enfants Congolais. (Psychological Tests and Academic Results of Congolese Children). Rev. Psychol. Appl. 1959. 9. 11-21.

A critical attempt to present three tests using two separate techniques was carried out in Katanga on 210 children in their 4th, 5th and 6th primary grades. They were administered at each level following a test of numerical reasoning capacity. The control group received the standard instructions and the experimental group carried out a prior series of numerical items analogous to those of the test. The aim was for the experimental group to avoid the errors of simple reproduction (such as those frequently made in Raven's 38th Matrix) and eventually to obtain a value level less aleatory (? variable) and more stable. The figures (?significance) were in fact superior in the experimental group. The article presents also the inter-correlation between the tests, the correlation of the tests with their academic record of the same grade and indicates the absence of correlation between the age and the results as much in their academic record as in the tests results. The only significant variable was the scholarly level that the child had achieved.

C. ESHER, F.J.S. Short Tests of Low-Grade Intelligence: II. Occupat. Psychol. 1941. 15: 112-9.

In diagnosis of mental defectives it is important to consider spatial aptitudes, emotional stability, emotional disturbances and age. A test procedure has been developed which may be administered in 45 minutes.

This may be supplemented by a performance battery of the same length. Briefer forms may be given in as little as 15 minutes. School record and employment history facilitate diagnosis considerably.

C.V. ESHER, F.J.S., RAVEN J.C. and EARL, C.J.C. Discussion on Testing Intellectual Capacity in Adults. Proceedings of the Royal Society of Medicine. 1942. Vol. XXXV, No. 12.

3 papers discussing "Testing Intellectual Capacity in Adeults".

(1) Esher administered untimed PM to dull military adults admitted to the psychoneurosis clinic.

(2) Raven: PM 1938 was designed to cover the widest possible range of intellectual development. It was not designed to differentiate clearly between individuals of any one level of mental ability. Used with people of subnormal ability, a relatively large chance factor is involved and the reliability of the results obtained is correspondingly low.

(3) Earl. A fully objective or mechanical analysis of intellectual process is not yet possible, for there is no test which cannot be solved in more than one way. This has been clearly shown by Weisenberg and McBride in their study of aphasics. So-called non-verbal tests are not, in fact, non-verbal for all cases.

EVANS, L. A comparative study of the Wechsler Intelligence Scale for Children (Performance) and Raven's Progressive Matrices with deaf children. Teacher of the Deaf, 1966, 64, 76-82.

The Wechsler Intelligence Scale for Children (Performance Sub-Scale) and Raven's Standard Progressive Matrices were administered to 100 deaf or partially hearing children. Three years after the initial testing, 42 of the subjects were retested. The W.I.S.C. (perf.) results had high internal consistency and high retest stability, and were distributed within reasonably normal limits.

The Progressive Matrices test was also a highly reliable measure of current intellectual output, but the results were substantially below normal and showed some fluctuation with time, and there was low intercorrelation with the W.I.S.C. (perf.) results.

C.E. EWING, A.W.G. and STANTON, D.A.G. A Study of Children with Defective Hearing. Teacher of the Deaf. 1943- 41. 56-59.

As yet unable to estimate the reliability of P.M. for deaf children. Present testing was undertaken partly

to see if P.M. is satisfactory for use with deaf children. A preliminary examination of the deaf children's scores suggests a reasonable degree of internal consistency. Approx. 3/4 (74.3%) were below the average for the East Anglian norms and nearly 1/2 (43.3%) are definitely subnormal. For an unselected sample of hearing children of similar social status, less than 1/2 were below the average for East Anglia and about a 1/2 were subnormal. So it is clear that results on P.M. for deaf children are less successful than for ordinary school children. A school for the deaf probably does contain a higher proportion of subnormal chiidren than an ordinary school. Another cause of poor performance may be that mental manipulation of percepts is facilitated by verbalisation, a process in which the deaf child is handicapped by his lack of linguistic experience.

C. EYSENCK, H.J. Neurosis and Intelligence. Lancet. 1943. 245: 362-3.

Records of 3,000 male and female neurotic Service patients (NCOs and other ranks) on P.M. are analysed. Neurotic group is neither more or less intelligent than comparable non-neurotic groups. This supports view that lower intelligence of neurotics is caused by a weakness in efficiency of mental functioning rather than inability to abstract and reason. On average, conversion hysterics are less intelligent than neurotics while dysmnesic hysterics are of average intelligence. Patients with chronic anxiety are on average more intelligent than neurotics. Distribution of scores in neurotic groups is abnormal (platykurtic), there were fewer cases of average intelligence and more cases of above average intelligence than would be found in a comparable sample of normals.

C. EYSENCK, H.J. The effect of Incentives on Neurotics and the Variability of Neurotics as Compared with Normals. Brit. J. Med. Psychol. 1944. 20: 100-3.

Two groups of 100 neurotics each were retested on P.M. 4 weeks after admission to hospital and variability compared with retest results of normal group of comparable age, social background and intelligence. One of neurotic groups was specially motivated by offer of money to anyone who could beat previous score by ten points. Test-retest reliability of normal group was significantly superior to that of two neurotic groups (.872 for normals, .809 and .816 for neurotics). Normals improved significantly more on retesting than did neurotics (3.74 points and average of 1.74 points). Specially motivated neurotic group showed less

improvement on retesting than did non-motivated group (difference not significant). Amount of 'scatter' closely related to amount of improvement shown on retest.

C. EYSENCK, M.D. A Study of Certain Qualitative Aspects of Problem Solving Behaviour in Senile Dementia Patients. J. Ment. Sci. 1950. 91, 337-345.

Progressive Matrices (1938) - Board form Sets A, B. A study of 100 male senile dements. Their score was equal to that of 8 year old children. They were noticeably worse in Set B than manic depressives or schizophrenics, but the order of difficulty of test items was the same as in children and normals. The retest reliability is 0.49, (0.71 for 60 problems) and it was noted that 25% of the total errors were on difficult items, the subject's solution being in one case right and in the other wrong. With regard to errors, only '2' was chosen more in seniles than in normals.

EYSENCK, H.J. and EYSENCK, S.G.B. The Interpretation of Children's Lie Scale Scores. Brit. J. Educ. Psychol. 1971, 41 (1) 23-31.

390 children were given an intelligence test (SPM) and a 100-item personality inventory purporting to measure E, N, and L. Factor analysis of the intercorrelations between items gave rise to three clearly defined independent factors identified as E, N, and L. Correlations of SPM with the three scales were N - .03, with E + .05 and with L - .29. This last correlation is significant and interpreted as showing that bright children 'lie' less.

C. FEINBERG, Irwin; GARMAN, Eugenie M. Studies of Thought Disorder in Schizophrenia: 2. Plausible and Implausible Errors on a Modification of the Progressive Matrices Test. Arch. Gen. Psychiat. 1961. 4: 191-201.

P.M. test was modified so that solutions included wrong items which were geometrically similar to problems (plausible error choices) and wrong items which were geometrically dissimilar (implausible error choices). Modified tests of 23 items were administered to normal subjects (N=67) and to groups of patients suffering from acute schizophrenia (recent cases N=37), chronic schizophrenia (long term cases N=23) and organic brain disease. Found that normal subjects make significantly fewer errors than any of groups of patients and that they make very few implausible errors. While groups of patients did not differ significantly in their mean total error scores, acute schizophrenics made significantly more implausible errors than did any of other groups.

Implications suggest a qualitatively unique impairment of cognitive function in these patients.

FEUERSTEIN, R. and SHALOM, H. Milestones in the diagnosis of the intelligence of socioculturally deprived children Megamot, 1967, 15, 174-187.

FOULDS, G.A. Variations in the Intellectual Activities of Adults: Their Assessment and Significance. pp. 61-2. Abstract. In Proceedings and Papers on the Twelfth International Congress of Psychology held at the University of Edinburgh, July 23-29, 1948. Edinburgh, Scotland. Oliver & Boyd Ltd., 1950.

C. FOULDS, G.A. and CAINE, T.M. Personality Factors and Performance on Timed Tests of Ability. Occup. Psychol. 1958. 32: 102-5.

In recent study, authors found scoring patterns on some cognitive tests were related to personality type rather than diagnostic type. Present study was of 68 women (20-59 years) admitted to hospital and suffering from a neurosis (hysteria, anxiety, depression) - Tested on battery of psychological tests and classified as to personality type (hysteriod and obsessive). For P.M. 1938 and Porteus Mazes, total Matrices time and total Maze tracing time do not differentiate between groups with similar personality ratings but do differentiate between groups with dissimilar personality ratings, regardless of diagnosis. For NIIP Group Test 80A (to assess spatial ability) no significant difference due to diagnosis but differences in scores seen when hysteric and obsessive groups compared.

C. FRACCHIA, J.F., FIORENTINO, D., SHEPPARD, C. and MERLIS, S. A Comparison of Techniques for the scoring of Avoidable Errors on the Raven Progressive Matrices. J. Psychol. 1969. 72 (1) 93-98.

Raven Progressive Matrices of 88 narcotic users divided into four M.M.P.I. profile pattern groups, were scored for avoidable errors with use of three scoring methods. Two methods (defining avoidable errors in terms of empirically determined difficulty levels) indicates significantly more reasoning errors were made by patients with paranoid profiles than by patients with either primary or secondary sociopathic patterns. Third method (based on expected test scores) did not score significantly different numbers of avoidable errors in the four groups. Data were interpreted as

indicating that manner of defining and that of scoring R.P.M. avoidable errors are important factors in determining sensitivity to reasoning errors related to pathological eidation.

C. FRACCHIA, J., FIORENTINO, D.: SHEPPARD, C. AND MERLIS, S. Raven Progressive Matrices: Avoidable Errors as a Measure of Psychopathological Ideational Influences Upon Reasoning Ability Psych. Reports. 1970. 26, 359-362.

S.P.M. protocols of 88 narcotic addicts, divided into four M.M.P.I. profile pattern groups, were scored for avoidable errors, Ss having psychotic-like profiles made significantly more reasoning errors than Ss with sociopathic patterns. These data were interpreted as evidence of the sensitivity of avoidable error measures to disturbances in consistency and accuracy of comparative and analogical reasoning performance. It was suggested that avoidable error indices might be used to judge the effects of pathological ideation, estimate potential level of intellectual functioning in clinical populations and serve as a criterion for treatment efficacies.

C. FRACCHIA, John: SHEPPARD, Charles; MERLIS, Michael AND MERLIS, Sidney. Atypical reasoning errors in sociopathic, paranoid and schizophrenic Personality types J. Psychology. 1970. 76, 91-95.

Raven Progressive Matrices of 90 narcotic addicts, divided into four M.M.P.I. profile pattern groups, were scored for atypical reasoning errors. Atypicality was defined as the selection of an alternative other than a primary or secondary distractor for a particular item. It was found that subjects showing psychotic profiles (428 paranoids and 987 schizophrenics) showed greater tendencies toward selecting infrequently chosen alternatives than sociopathic profile subjects (49 primary and 42 secondary). It was suggested that these data reflect the sensitivity of P.M. error measures to disturbances in intellectual performance associated with varying degrees of psychopathological dysfunction.

FRASER-ROBERTS, J.A. Further Observations on the Efficiency on the Progressive Matrices Test. War Cabinet Expert Committee Report. 1943.

The author follows P.E. Vernon (1942) in judging the efficiency of the Matrices by its prediction of the T^2 score (or some other good measure of general intelligence). The efficiency of prediction was found to be lowest at 18 points, and then increasingly slowly at first, then more and more rapidly until the very high ceiling of the test is reached. Below a score of 18 points, the predictive efficiency again rises until at imbecile levels the test is once again a good measure of 'g'.

GABRIEL, K.R. The Simplex Structure of the Progressive Matrices Test Brit. J. Stat. Psychol. 1954. 7:9-14.

Progressive Matrices test was administered to 830 male and female recruits to the Israeli army. Guiding principle was to present first a set of items involving no relation finding at all (in order to familiarise the subject with general notion of fitting insets) and then to start with a simple nonverbal form of analogies test - the 2 x 2 type of "matrix" that had already been found to yield an effective test of intelligence and so proceed to larger matrices, progressively increasing the number of relations introduced at each stage. The special value of simplex analysis therefore lies in providing a test testing a clear hypothesis of test structure.

GAUCHET, F. AND GOGUELIN, A.M. et P. Reflexions sur le test F. de Cattell Le Travail Humain. 1953. 16. 3-4.

The authors studying Cattell's test F concluded to the existence of factor F but show - that this factor is found in many other tests more easy to correct than Cattell's test - that Cattell's test F is sufficiently saturated in a factor of information background not to be able to be interpreted directly without being integrated in a larger field, - that factor F itself appears to consist of at least 2 subfactors. Dynamism not independent of motricity and a more elaborate dynamism under control of mental functions.

V. GIBSON, Q.H. Intelligence Tests and University Careers of Medical Students Lancet. 1948. 255:323-4.

The University careers of 2nd year medical students taking the Matrix Test (1938) in 1942, 1943 and 1944 have been followed up. The relation between the test and examination results is slight. The careers of individual students were remarkably consistent throughout the whole course. The Cattell Test (Cattell Scale III, form A 1934 - largely verbal) correlated only slightly with the matrix test and, different in form, gave essentially similar results.

E. GILES, George C. Predictive Validity of Progressive Matrices and Two Other Non-Language Tests of Mental Ability J. Educ. Meas. 1964. 1. (1) 65-67.

A group of 130 students from two junior high schools completed P.M. and two nonlanguage tests published in the United States. Relationships between predictor measures and academic criteria were studied. Although consistently higher validity correlations were found for P.M., the analysis of variance of the three transformations showed no significant differences in relationships among the three nonlanguage tests and achievement criteria (FLI). So evidence does not suggest that the overall predictive validity of P.M. is superior to the overall predictive validity of the two nonlanguage tests used here.

A. GEORGAS, J.C. Standardisation of a Vocabulary Intelligence Test Unpublished Final Progress Report, 1970, Research MH 12544-01. The Athenian Institute of Anthropos, 8, Demetriou Soutsou Steet, Athens, 602. Greece.

A report concerned with the development of a vocabulary test in Greek, in which the S.P.M. was used as part of the study. Data were obtained from 727 Athenian children and validity and reliability coefficients are given. Results are related to age and S.E.S.

E.C. GOETZINGER, C.P. "Psychological Assessment" in Fusfeld, Irving S. A Handbook of Readings in Education of the Deaf and Postschool Implications. C.C. Thomas. Springfield III. 1967. pp. 284-299.

In the course of a more general discussion of testing of the deaf, details are given of the unpublished dissertations by Wright (1955) and Gupta (1965), using SPM.

E. GOETZINGER, C.P., DIRKS, D.D. AND BAER, C.J. Auditory Discrimination and Visual Perception in Good and Poor Readers Annals of Otology, Rhinology and Laryngology. 1960. 69 (1) 121-136.

Fifteen poor readers from a public school reading clinic were matched with fifteen good readers from same school on basis of Binet I.Q. and C.A. All were males. Subjects were administered a battery of tests including W-22, Rush Hughes and Wepman auditory discrimination tests, Raven's P.M. (1938), Gottschaldt Figures, Figure-Ground test and California reading test, Form X. Difference between groups on Raven's test was significant at .01 level of confidence. Positive correlations (.01 level) found between Gottschaldt and Raven's tests and between Raven's test and reading. When a t-score combination of Rush-Hughes, Wepman and Raven's tests were correlated, with reading, a correlation of .731 was obtained.

C. GOETZINGER, C.P., ORTIZ, J.D., BELLROSE, Betty and BUCHAN, L.G. (1966) A Study of the S.O. Rorschach with Deaf and Hearing Adolescents Amer. Annals of the Deaf. 1966. 11. 510-522.

Responses to structural objective Rorschach test of 24 deaf advanced students (12 males, 12 females) were compared with those of comparable group randomly selected from junior and senior high school classes. Scores of deaf subjects were inferior to those of hearing in Theoretical Function and Inductive Reasoning but higher on structuring. Only sex differences were significant on Rigidity. Deaf responses tended to be unique and rare. The deaf manifested higher aggression, less cooperation, above average tendencies in consistency of behaviour, less than average anxiety and a higher degree of non-conformity. Both deaf and hearing females scored below average in ability to stick to or complete a task.

GOETZINGER, C.P., WILLS, R.C. and DEKKER, L.C. Non-Language I.Q. Tests Used with Deaf Pupils. Volta Review. 1967. 69. 500-506.

96 children in intermediate dept. of a state school for the deaf were administered three non-language tests of intelligence - Chicago non-verbal, 1938 P.M. and Terman Merrill non-language multimental test. 3-1/2 months later the tests were repeated. Results showed a significant improvement on the raw scores of the Raven's test. Although subjects had normal I.Q.s on the Chicago test, they showed about a two year retardation on the Raven and Terman tests. When the results were evaluated in terms of Gupta's findings of normal intelligence on the Raven and Terman tests for older subjects (CA 18-1/2 years) at the same school, it was postulated that dearth of experiences and not limited language was the reason for the differences on the assumption that reading achievement for the deaf is an index of language ability.

A.V. GOLDSTEIN, M.J. The Progressive Matrices Intelligence Test Applied to Three Racial Groups in Cape Town. M.A. Thesis, University of South Africa. 1945.

A study of the intelligence of different racial groups in South Africa after attempting to allow for differences in education. Results showed that Matrices Test does minimise inter-racial differences in intelligence, but even the material of PM may be unfamiliar to children reared in cultural environments where manipulation of such patterns is not common.

A.E. GONZALEZ, Maria et al. Estudio psicologico y social para ayudar a la eleccion del plan diferendiado en dos liceos de Santiago. ("A Psychological and Social Study for Aiding the Selection of a Differentiated Plan at Two Santiago lycea".) Archivos del Instituto de Psicologia. 1965. 3 (1) 32-34.

Subjects were 225 male and 218 female 11th grade students. Intelligence, adaptation, vocational and professional interests and family society structure were tested by means of a general aptitude test, progressive matrices, the Bell inventory, the California Test and a questionnaire. Results were:

1. Aptitude test revealed IQ means of 107 for males and 100 for females.
2. P.M. were above the norm.

3. Vocational interests showed a marked predilection for medicine and dentistry.

4. Tendencies towards adaptation were normal.

GRANICK, S. Brief tests and their interrelations as intelligence measures of aged subjects. Proc. Ann. Convention A.P.A. 1971, 6 (Pt. 2), 599-600.

Evaluated the intelligence of applicants and residents of a home for the aged by means of the Ammons Full-Range Picture Vocabulary, Raven's Progressive Matrices, and the WAIS. Intercorrelations among the test and subtest scores showed a wide array of correlations, ranging from .37 to .92, and reflecting a probable factorial composition of intelligence which is similar to that of younger adults. The Ammons Information and Vocabulary scores were found to correlate highly (.89 and above) with the Full Scale WAIS. Various combinations of 2 tests also correlated .90 and above with the WAIS, the Ammons and Block Design being highest (.94). Brief type tests are, thus, effective in approximating the results achieved by aged Ss on the WAIS.

E. GROSVENOR, T. Refractive state, intelligence test scores, and academic ability. American Journal of Optometry & Archives of American Academy of Optometry, 1970, 47 (5), 355-361.

In an experiment with 707 intermediate school European Maori children, it was found that myopes had higher mean scores than hypermetropes on both the Otis Self-Administered Test and the Raven Progressive Matrices test. Myopes also occurred in significantly greater numbers in high ability than in low ability classrooms. Results are discussed in terms of 4 hypotheses, previously suggested by M.J. Hirsch in his experiment with 554 school children given the CTMM: (a) myopia is an overdevelopment of the eye just as hypermetropia is an underdevelopment; (b) intelligence test scores may be influenced by the amount of reading a child does; (c) the more intelligent child may read more and thus become more myopic; and (d) in taking the test, a premium is placed upon the ability to perceive fine detail efficiently, thus giving the myope an advantage.

A.E. GUINAGH, B.J. An Experimental Study of Basic Learning Ability and Intelligence in Low Socioeconomic Populations. Doctoral thesis. 1969. Michigan State University.

> In this study, Basic Learning Ability was measured by a Digit Span Test and intelligence was measured by S.P.M. Three different populations of third grade children were tested (a) low SES black (b) low SES white (c) middle SES white. In the low SES white sample, both the high and low digit span groups had scores on the SPM post-test significantly greater than their respective control group ... the major finding was that scores on SPM can be substantially increased as a result of a training programme.

A.E. GUINAGH, Barry J. An experimental study of basic learning ability and intelligence in low socio-economic-status children. Child Development, 1971, 42, 1, 27-36.

> The purpose of this study was to examine 2 constructs, basic learning ability and intelligence, as proposed by Arthur Jensen to explain the different patterns of ability found in the middle and low SES levels. In this study, basic learning ability was measured by a digit span test and intelligence by SPM. Both low SES black children and low SES white children were tested. Training on SPM had different effects on the two races.

C. GUPTA, Kumwar Pal. A Study of Two Non-language Intelligence Tests with Deaf Subjects in the Intermediate and Advanced Departments of the Kansas School for the Deaf. Unpublished Master's thesis. University of Kansas. 1965.

> For a description of the findings in this unpublished work see: Goetzinger, Wills and Dekker (1967) p. 504.

HALL, Julia C. Correlation of a Modified Form of Raven's Progressive Matrices (1938) with the Wechsler Adult Intelligence Scale. J. Consult. Psychol. 1957. 21: 23-6.

> Reliability, item difficulty and correlation with W.A.I.S. of a modified (30 item) form of Progressive Matrices (1938) was investigated. Findings were:
> 1. Kuder Richardson reliability coefficient for modified version of Matrices is 0.864 (N=82).
> 2. Correlation of modified Matrices with W.A.I.S. Performance Scale is 0.705, with verbal scale score .584 and with full scale score .721. Difference in correlations with verbal and performance scales suggests that Matrices may be a useful complement to

verbal scale in evaluating intellectual function of brain damaged individuals. 3. Severe shortcoming of modified matrices was its low ceiling. Score distribution showed significant departure from both normality and symmetry. An analysis of item difficulty indicates that a reduction in number of each item and their placement with items of greater difficulty probably would result in a modification having more adequate discriminative power.

HALSTEAD, H. An Analysis of the Matrix (Progressive Matrices) Test Results on 700 Neurotic (Military) subjects, and a comparison with the Shipley Vocabulary Test. J. Mental Sci. 1943. 89: 202-15.

Significantly lower scores were made by neurotics, who show not only medians but wider ranges. Attitudes of neurotic subjects to the testing situation were good, only 5% of 2,500 showing negativism. The current method of assessing unreliability of scores on the Matrix test is mentioned, with further suggestions incorporating a comparison of individual records, with an overall order of difficulty of the 60 items on the test and an index of efficiency by the use of a time-score index.

C. HALSTEAD, H. Abilities of Male Mental Hospital Patients. J. Mental Sci. 1950. 96: 726-33.

Two 'easy' group tests, vocabulary and arithmetic and two 'difficult' ones, progressive matrices and mechanical comprehension, were given to 537 patients. Mental disturbance has a more deleterious effect upon test score than does age. Length of hospitalisation itself does not bring about poorer results by patients but the correlation of test score with length of hospitalisation is negative.

C.V. HALSTEAD, H. and SLATER, Patrick. An Experiment in the Vocational Adjustment of Neurotic Patients. J. Mental Sci. 1945. 92: 509-15.

84 patients interviewed and tested at Mill Hill Hospital during early part of the war (part of a larger group recommended for a special course in engineering) were graded by their instructors according to their suitability for this type of work. On the whole, the results appear satisfactory. Only five patients were graded unsuitable. The records of all patients, including age, scores on five tests (one of which was P.M.) and answers to a questionnaire were related to their grades. It was found that by taking previous engineering experience and scores on the Carl Hollow

Square Scale into account, further improvements might be made in the selection reducing the errors of prediction by 10%.

V. HARDING, D.W. Prognostic Tests for Students of Architecture. Occup. Psychol. 1943. 17. 125-131.

The Matrices was one of a battery of tests given to new entrants to the School of Architecture at Liverpool University, the aim of the investigation being limited to identifying those who would fail in their first year's work. The Matrices was found to be one of the three tests in which poor marks seemed to be closely associated with failure in the first year's work.

C. HARFORD, T. and EISENTHAL, S. An Item Analysis of the Progressive Matrices test for a Sample of hospitalised Schizophrenics. J. Clin. Psychol. 1969. 25 (2) 185.

The Progressive Matrices test was administered to 52 male schizophrenic patients at a Veterans Administration Hospital. The results of an item analysis indicated that sets C and D discriminated satisfactorily while sets A, B and E did not.

HASETH, K., SHAGASS, C. and STRAUMANIS, J. Perceptual and personality correlates of EEG evoked response measures. Biological Psychiatry, 1969, 1 (1), 49-60.

Recorded somatosensory (SSER) and visual evoked responses (VER) and EEG in 40 healthy undergraduates, and related the data to tests of extroversion, neuroticism, intelligence (including the MPI/Eysenck Personality Inventory, and Raven Standard-Progressive Matrices of 1958), simple visual perception (letter recognition, line difference discrimination), complex visual perception (closure flexibility, closure speed) and lifted weight discrimination.

C. HEIM, A.W. Learning in Intelligence Test Performance. Abstract. Q.B. Brit. Psychol. Soc. 1949. (3) 120-1. Reply by John C. RAVEN: 1949: (3): 197-8. Rebuttal by A.W. Heim. 1949. (3) 219-20.

Two experiments described. Two groups (10 intelligent subjects and 12 mentally defective boys) took the same intelligence test (AH4) 10 times (once a week). Mentally defective boys also given Raven's P.M. 1938 one month after 10 tests on AH4. For both groups, intercorrelations between score on 10 testings and on each set of scores were extremely high. P.M. scores of schoolboys were

also extremely high for mental defectives. Three reasons suggested. RAVEN'S REPLY: Criticised direction and plan of Miss Heim's experiment. Would expect educable mental defectives to obtain reasonably high scores on Matrices test. HEIM'S REPLY: Felt it was worth mentioning that mental defectives in any circumstances could achieve such a high score on P.M. Other replies to criticisms also given.

C. HEIM, A.W. and WALLACE, J.G. The Effects of Repeatedly Re-Testing the Same Group on the Same Intelligence Test. Q.J. Exp. Psychol. 1950. 2: 19-32.

Twelve mentally defective schoolboys between ages of 14 and 16 took the AH4 test ten times without knowledge of results at weekly intervals and Progressive Matrices about 30 days following last test period. They tended to improve throughout the ten testings. Scores on Part II (diagrammatic) started at a higher level and showed more improvement than Part I (verbal and numerical). Relatively high P.M. scores indicate some practice effect produced by repeatedly taking a different test. Differences between mental defectives and a normal group of intelligent adults were: I. Individually the defectives were more erratic and unpredictable. II. They also found Part II easier than Part I. III. Retarded group was less consistent in their errors and correct answers.

E. HIGDON, Bettina P. Raven's Progressive Matrices, Set I, Administered to Even Aged Students from Six to Sixteen. Master's thesis, Alabama College (Montevallo, Alabama). 1961.

HIMMELWEIT, H.T. Speed and accuracy of work as related to temperament. Brit. J. Psychol. 1946, 36, 132-144.

A study of speed and accuracy on five tasks performed by 100 neurotic subjects. SPM was administered to all and no difference was found between hysterics and dysthymics.

V. H.M.S.O. Report of an expert committee on the Work of Psychologists and Psychiatrists in the Services. H.M.S.O., London, 1947.

In an appraisal of the work of psychologists in the Services, the Matrices is described as one of the psychological tests in general use.

C. HOLDEN, Raymond H. Improved Methods in Testing Cerebral Palsied Children. Am. J. Mental Def. 1952. 56: 349-53.

This paper attempts to illustrate a more flexible use of present standardised intelligence tests in order to determine most adequately the intellectual level of a physically handicapped, brain injured child. It has been pointed out that recent studies have shown mental retardation to be more prevalent in brain injured cerebral palsied children than in the general population, even when allowance for the physical handicap has been made. Two new tests, Raven's Progressive Matrices and the Ammons Full Range Picture Vocabulary Test need further evaluation to determine their usefulness in determining the intellectual level of physically handicapped brain injured children and adults.

C. HOPKINS, Barbara and ROTH, Martin. Psychological Test Performance in Patients Over Sixty: I. Paraphrenia, Arteriosclerotic Psychosis and Acute Confusion. J. Ment. Sci. 1953. 99: 451-63.

Three tests (including a shortened form of P.M.) were given to consecutively admitted patients aged 60 and above who fell into diagnostic categories of paraphrenia, arteriosclerotic psychosis and acute confusional state. Test performance in each group was compared with that in affective psychosis and senile psychosis (previously described). Test scores placed paraphrenia and cases of acute confusion with affective group. Scores of arteriosclerosis patients fell somewhere between senile and affective group. Senile psychotics showed a distribution of scores almost wholly distinct from that shown by affective psychosis, paraphrenia and acute confusion. Distribution in case of arteriosclerotic psychosis showed some overlap with affective and senile groups.

HORNOWSKI, Boleslaw. Badanie zdolnosci myslenia testem percepcyjnym "Matrix" J.C. Ravena. Filozofia, Psychologia, Pedagogika, 1959, 3, 17-33.

This is a study of thinking capacity, using SPM. Intertest correlations are given for SPM and Otis. Largest r is between SPM and the Maths subtest of the Otis scale - r for boys = .87 for girls, r = .67. Using factory workers, predictive validity was high, for females r = .7, for males r = .72.

E. HORNOWSKI, B. Analiza Psychologiczna Testu Percepcysnego J.C. Ravena. ("The Psychological Analysis of J.C. Raven's Progressive Matrices Test of Perception".) Panstwowe Wydawnictwo Naukowe. 1959. p. 213.

A representative group of Poznan' school children (544 boys and 501 girls) was administered SPM to find out the diagnostic and prognostic value of this scale and to adapt it to the mental development of Polish youth. It was also administered to 62 graduate students at Poznan University. It is concluded that the SPM scores show a normal distribution and that the test has diagnostic and prognostic value.

?. HRABAL, V. Zkusenosti s ceskym prekladem testu struktury intelligence zvlaste u starsich zaku ZDS a stredoskolaku. [Experience with the application of Czech translation of IST (Amthauer) to elder pupils of elementary nine-year schools and to students of secondary schools.]

Describes experiences with the application of the Czech translation of R. Amthauer's Intelligence Structure Test (IST) to 8th and 9th graders of elementary schools and to students of secondary schools. Methods used were: (a) comparison of results with those obtained by the use of the other similar intelligence tests, (b) interrelation and analysis of subtests as to their objectivity and proper design, and (c) correlation of results with conventional schoolmarks. The variables were: performance levels of students; other intelligence tests, e.g. WAIS, SPM and subtests of the IST. Experience showed that IST generally favors high performance students and particularly, natural sciences students and mathematicians. 137 pupils from Prague schools took the IST and the average IQ for excellent, average, and below average students were 136, 124, and 81 respectively. Corresponding figures using the SPM Test were 118, 114, and 97. There was a close correlation between the resulting total school marks and IST total score. Experience indicated that relation of IST to school marks is considerably closer than in SPM but not so close as in WAIS. The experience obtained with the application of IST was satisfactory.

C.E. HVOZDIK, Jan. K diagnostickej hodnote školského prospechu žiakov ("Diagnostic Value of Pupils' Proficiency"). Jednotná Skola. 1967. 19 (1) 40-62.

288 elementary school children (144 male, 144 female) were divided into three groups - (1) those who failed (2) average and (3) proficient. A comparative analysis of the results was used as a fundamental method in the evaluation of the W.I.S.C. Verbal Scale and P.M. and school proficiency. The groups differed most in abstract

thinking and least in mechanical memory. The diagnostic and prognostic significance of these relations are analysed.

C. IRONSIDE, W. The Clinical Use of Psychological Tests. N.Z. Med. J. 1955. 54. 300. 173-177.

In a discussion of the use of psychological tests, the author describes the Matrices as a test of intelligence, largely eliminating the influence of education - and its application to psychiatric cases.

A. IRVINE, S.H. Ability Testing in English-Speaking Africa: An Overview of Predictive and Comparative Studies. Rhodes-Livingstone Journal. 1963. 34, 44-55.

Discusses the usefulness of various types of test in African settings. Reports a factor analysis of a number of tests, including SPM, which showed a factor loading of .52 on "g:ed" and .27 on "vis:perc".

A. IRVINE, S.H. Some Practical and Theoretical Problems of General Ability Testing at the African Standard Six Level in Southern Rhodesia. Proceedings of the East African Institute of Social Research Conference. 1963.

A discussion of the approaches needed in the administration of psychological tests to African groups. Three modes of presentation of SPM are described and the relative merits of these modes are considered.

A. IRVINE, S.H. Towards a Rationale for Testing Attainments and Abilities in Africa. Brit. J. Educ. Psychol. 1966. 36 (1) 24-32.

A brief review of recent research in Africa in the field of cognitive measurement is followed by a discussion of the central issue of test score meaning in testing educational skills and aptitudes. Influences on test score meaning are hypothesised, among them sex differences and role relationships. A major influence is the quality of school attended. Two factor analyses are reported. They indicate that constructs like 'g', 'v.ed' and 'n' may have legitimate psychological meaning in nonwestern cultures. To assess the comparative validity of the same test used on different cultural groups, item difficulties for Raven's Progressive Matrices between British and African groups were correlated. The resulting rank correlation (1695) was taken as prima facie evidence that the test scores were only partly comparable, but encouraged using the Raven as a 'g' reference in factor analysis. The results quoted above

were gained from a representative sample of over 1600 African 8 year old educated children in Southern Rhodesia and from a follow up group of 291 from the same sample in Form 1 (9 year educated). In addition, concurrent validities with primary school head master's estimates using combinations of traditional and experimental tests were in the region of .90 while multiple correlations of .70 uncorrected for range restriction were gained with a Form I multiple criterion. These correlations were achieved by selecting variates for regression analysis with reference to the factor analyses carried out in an attempt to check the psychological meaningfulness of the factor solutions.

A. IRVINE, S.H. Figural Tests of Reasoning in Africa: Studies in the use of Raven's Progressive Matrices Across Cultures. Internat. J. Psychol. 1969. 4, 3. 217-228.

Experiments involving subjects from various educational groups in Africa and G.B., using Raven's P.M., compared item difficulty and described strategies employed. Factor analysis shows that environmental variables, whether verbally loaded or not, are not associated with central African subject. Cross-cultural analysis reveals that item difficulties change from culture to culture and that tests scores approach Western patterns as the groups adopt western value systems. Appearance of differing individual strategies in problem solving renders it unwise to assume that the same total score proves evidence of identical samples of psychological behaviour. Research with African subjects shows that "the sources of variance exist that call for some revision of ... assumptions about the reduction of cultural bias in figural test items".

A. JAHODA, G. Assessment of Abstract Behaviour in a Non-Western Culture. J. Abnorm. Soc. Psychol. 1956. 53. 237-243.

The series of investigations reported indicate that the problems inherent in any attempt to assess abstract behaviour in different cultures are closely analogous to those encountered when one is trying to compare levels of intelligence. Various investigations in different parts of Africa have accumulated data showing the difficulties Africans experience in manipulating spatial relations and perceiving complex shapes. The available evidence suggests that the absence of adequate environmental support for such abilities is mainly or perhaps entirely responsible. The findings with Ravens Progressive Matrices are in line with this view.

E. JAMUAR, K.K. Personality and Achievement Psychol. Studies. 1961. 6: 59-65.

Two intelligence and two personality tests were administered to a group of college students. Results showed high dependence of achievement on personality adjustment. Home, emotional and social adjustments were very important. Introversion was also found to be important in achievement.

JASTAK, Joseph. Problems of Psychometric Scatter Analysis Psych. Bull.46. 3. 177-97.

The writer presents the theoretical considerations involved in psychometric scatter analysis. Special sections deal with scale standardisation, fourfold analysis of tests, external criteria of validation, reference points, weighted scores, sex differences, arithmetical differences as scatter measurements and psychosis, co-operation and scatter. He suspects that SPM measures several important group factors in addition to 'g'. To find that the SPM is a relatively pure test of 'g' must surely be due to faulty experimental design.

E. JENSEN, Arthur R. I.Q. and Scholastic Attainment Harvard Educational Review. 1969. 39 (1) 1-123.

In his discussion of the relative contributions of environment and heredity to intelligence, Jensen frequently uses Progressive Matrices as an example of a relatively pure measure of 'g' and quotes the study of Higgins and Sivers (1958) in support of his propositions.

A. JOHNSON, Dale L., JOHNSON, Carmen A. AND PRICE-WILLIAMS, Douglas. The Draw-a-Man Test and Raven's Progressive Matrices Performance of Guatemalan Boys and Ladino Children Revista Interamericana de Psicologia. 1962. 1 (2) 143-157.

Draw-a-Man Test (DAMT) and P.M. were administered to a group of highland Guatemalan public school children. DAMT, administered to 256 children, showed an overall mean I.Q. of 85. Boys scored significantly higher than girls. No important differences between scores of Indians and Ladinos. P.M. given to 34 children, also yielded low

intelligence scores. Significant correlations between teacher ratings of intelligence and above tests suggest latter have a certain validity in Guatemala. Despite nonverbal nature of test problems, seemed likely that formal and informal cultural differences in educational goals functioned to depress test scores. Also low health levels have been associated with low test performance, in other areas and were present here.

C. JOHNSON, Elizabeth Z. The Use of the Rorschach Prognostic Scale with Raven's Progressive Matrices to Predict Play Therapy Progress Among Retarded Children J. Proj. Tech. 1952. 16:385.

Rorschach records of 18 children carried in play therapy and psychological counselling were scored according to Prognostic Scale. Subjects had previously been reported as 'improved' (N=13) and 'unimproved' (N=5) in play therapy behaviour. Clinical evaluation of group was conducted on their P.M. Scores relative to populations norms. All 13 'improved' children showed a Raven Z-score equal to or higher than Binet Z-score while all 5 'unimproved' had Raven Z-score lower than Binet. Suggests the Raven P.M. may provide estimate of ego capacity and super ego potential.

C.E. JOHNSON, Elizabeth Z. Sex Differences and Variability in the Performance of Retarded Children on Raven, Binet and Arthur Tests J. Clin. Psychol. 1952. 8:298-301.

The quotients obtained on the Binet, Arthur and Raven for a group of 30 boys and 30 girls in a school for mental defectives were studied. On all 3 tests, the boys scored higher than the girls but the girls were more variable. There was more individual variability on the three instruments for the boys than for the girls. The Raven correlated reliability but not highly with the Arthur and the Binet, r's tending to be lower for the less variable group, the boys. The Raven is viewed as a test of super ego capacity. Differences in score and in individual variability for the sexes is related to "delayed resolution of the Oedipus complex among boys".

C. JOHNSON, Elizabeth Z. The Clinical Use of Raven's Progressive Matrices to Appraise Potential for Progress in Play Therapy: A Study of Institutionalized Mentally and Educationally Retarded Children Discussions by Anna S. Elonen and Thorleif G. Hegge. Am. J. Orthopsychiatry. 1953. 23: 391-405.

In a study of subnormal children, the author has found that the pattern of "Raven high-relative-to-the Binet" is indicative of superego capacity and hence potentiality for improvement through the emotional re-education of play therapy. In the discussion, Anna S. Elonen raises several questions as to the design of the study and techniques which are answered by Thorleif G. Hegge.

C.E. JOHNSON, Elizabeth Z. Individual Patterns of Emotional Functioning in Children of Comparable IQ's: Implications for Education Am. J. Mental Def. 1953. 57:681-6.

Brief case histories which suggest that the potential indicated by a Raven Progressive Matrices Z-score has some relevance to the programme of emotional re-education undertaken in individual play therapy and psychological treatment are presented. The Raven-Binet pattern may provide a prognostic sign which, in conjunction with other considerations, will be useful in selecting children for psychological treatment.

C. JOHNSON, Elizabeth Z. Klopfer's Prognostic Scale Used with Raven's Progressive Matrices in Play Therapy Prognosis J. Proj. Tech. 1953. 17:320-6.

Sensitivity of Raven's P.M. as clinical predictor of play therapy progress (conceived as a function of superego potential) was investigated using Rorschach Prognostic Scale of Ego strength. Initial and terminal prognostic scores computed for group of children previously reported as 'improved', or 'unimproved' in psychological treatment. For both groups, terminal change was in expected direction and consistent with direction of Binet - Raven Z-difference. Clinical investigation of discrepancies suggests while Rowe may be more accurate predictor of play therapy responses, Rorschach Prognostic Scale more reliably estimates level of improved behaviour in short term clinical treatment.

C.E. JOHNSON, J.C. Educating Hearing-impaired Children in Ordinary Schools. Manchester University Press. 1962.

Describes studies of hearing-impaired children in normal schools. Innate ability assessed by SPM of 55 children showed that the distribution of scores for the group is very nearly a normal one.

JONES, H. Gwynne. Comments on "The Validity and Interchangeability of Terman-Merrill and Matrices Test Data" by D. Walton. Brit. J. Ed. Psychol. 1956. 26:141.

Short report supporting PM against criticism by Walton. There is no denying that PM is instrument which to large extent measures "general cognitive ability of an individual". Matrices results are reported in terms of IQ equivalents as consumers are most familiar with scores in this form. I.Q.s are derived by translation of percentile ranks by means of tables of normal curve into Sd values, then expressed in terms of distribution which with mean 100 and SD 16. So reported score is methodologically equivalent to IQ on a Wechsler Test.

N. JORDAN, Thomas E. Normative Data on the Progressive Matrices (1938) Psychol. Report. 1962. 10:122.

The present study was intended to obtain normative data for a sample of American rather than British adults and to obtain norms applicable to a college population. A 15% random sample (N=365) of an entering Freshman class (N=2413) at a midwestern university was used. A table shows the raw scores arranged to yield percentile scores.

C. JORDAN, Thomas E., AND DECHARMS, Richard. The Achievement Motive in Normal and Mentally Retarded Children A. J.Ment. Def. 1959. 64:457-66.

An evaluation is made of conceptual and empirical status of the achievement motive in the study of mental retardation. Using two groups of mentally retarded, educable, adolescent males and a comparable group of normals, this study found that the achievement measure is not applicable to predication of academic performance whether in a first order correlational relationship or in a multiple

correlational relationship with an intelligence measure. Authors report that mentally retarded children are subjected to atypical child-rearing practices, at least as far as achievement motivation is concerned, and that educable children exposed to a special curriculum give evidence of this treatment in personality. Thirty items of SPM used with material projected on a screen for 20 seconds.

C. JURJEVICH, R.M. Avoidable Errors on Raven's Progressive Matrices and Psychopathological Indices Psych.Rep. 1967. 21. 364.

Hypothesis was that avoidable errors on P.M. are positively related to number and intensity of recognised symptoms troubling a patient and to MMPI indices of character disturbance, anxiety, etc. Subjects were 151 AF personnel, mean age 23.5 years. P.M. mean I.Q. estimate 110.2. Results indicate a moderate significant association between avoidable errors on P.M. and degree of neurotic and characterological aberration. However, such relationship found also among those who make fewer mistakes than expected. Evident that some types of intellectual performance of emotionally disturbed subjects are not systematically influenced by their effective turmoil. Correlations of I.Q. estimates from P.M. and errors of P.M. are significant but low (-.19) for raw errors and (-.27) for weighted errors.

C. KALDEGG, A. Friedel: A Clinical Study of Culture Pattern, Personality and Pathology Brit. J. of Projective Psychology and Personality Study . 1968. 13 (1) 5-10.

Presents the case of a 30 year old German woman who became emotionally disturbed while in nurse training in England. A diagnostic evaluation based on the Progressive Matrices, parts of the Wechsler, Lennep's 4-Picture test, and the Rorschach are presented. Following transfer to another hospital, the patient's symptoms of paranoid thinking became more prominent, even though she continued nurse training without any complaints from others. Her mental condition worsened while on leave in Germany. It is concluded that her defenses in her own country were less effective than those she was able to mobilize in a less familiar environment.

KALINA, Witold. Wplyw wewnetrzneg trafnosci testu na jego trafnosc zewnetrzna . (The influence of the Internal Validity of a Test on its External Validity). Przeglad Psychologiczny. 1967. 14. 68-76.

The paper deals with a specific internal validity of Raven's test (1938 version), namely with the discrimination power of items in scale and their relative weight, as revealed in their influence on the internal validity of the test. A study of 370 girl students and 370 boy students served the author to establish the relative value of items in scale by means of the coefficient of discrimination power of a test, which serves to verify the validity of the scale key (the original hypothesis of the author of the scale) by means of an experimental group. The author shows that the verified discrimination power can help to evaluate the hypotheses of the author of the scale as to which answer is to be considered correct. The influence of item weighting on the external validity of the scale, i.e. its correlation with the objective criterion, has been also demonstrated.

C. KASPER, Sidney. Progressive Matrices (1938) and Emotional Disturbance J. Consult. Psychol. 1958. 22:24.

Paper summarises (a) P.M. and W.A.I.S. Vocabulary Test relationships to morbidity scores derived from Loor Multidimensional Rating Scale for Psychiatric Patients (M.S.R.P.P.) and (b) relationship to morbidity of two points or more deviation between expected and actual scores in any of P.M.'s five sets. Subjects were 50 consecutive first admissions to hospital. P.M. and W.A.I.S.-V. were in 48% agreement. 82% (N=41) of cases scores as high or higher on P.M. as on W.A.I.S.-V. with P.M. scores greater in 34% (N=17) of total cases. Found .50 correlation between P.M. and W.A.I.S.-V. ($p < 0.05$) - similar to previous findings. No meaningful relation found between ratings of morbidity and estimates of intellectual functioning. None of disparities in P.M. sets of scores meaningfully related to morbidity scores.

A.E. KEEHN, J.D., AND PROTHRO, E.T. Nonverbal Tests as Predictors of Academic Success in Lebanon Ed. & Psychol. Meas. 1955. 15:495-8.

It was hypothesised that nonverbal tests would not be effective prognosticators of school grades in Lebanon. The Cattell Culture Free Test, the French Dominoes Test D48, Raven's Progressive Matrices Test and a number series test were administered to Arab students in "American" and "French" sections of the International College at Beirut. Although the tests were heavily loaded on a single factor, they were only slightly correlated with either academic marks or teachers' judgments of intelligence.

A.E. KHATENA, J., CHEW GUAN KIANG, AND GOWAN, J.C. Reliability of the Raven Progressive Matrices Test with Asian School Children. Education in Malaysia. 1964. 1.22-23.

E. KING, W.H. The Development of Scientific Concepts in Children Brit. J. Ed. Psychol. 1963. 33:240-52.

This paper describes the responses of children to 20 science questions and relates these responses to age and ability represented by scores on a verbal and nonverbal test (P.M.). A relationship is established for certain types of question between their facility values and the grades obtained. Rate of growth of scientific knowledge is found to be similar for boys and girls. Boys and girls of 10 years of age show no significant differences in knowledge of science concepts but there is significant differentiation in secondary school children.

C. KINGSLEY, L. Functioning of Acute and Chronic Schizophrenics on Measures of Abstract Reasoning J. Clin. Psychol. 1969. 25 (2) 144-147.

A battery of tests designed to measure abstract reasoning was administrated to 130 male subjects, including 50 acute schizophrenics, 30 chronic schizophrenics and 50 normal controls. All groups were matched for education, and premorbid (or in the case of control group, previous level of mental ability). All measures differentiated the As and

Cs groups for the C groups. None of the measures differentiated the As from the Cs groups. Use of Gorham Proverbs, Raven's Progressive Matrices and Grassi BST is recommended as an aid in differential diagnosis for schizophrenia.

A.N. KLINGELHOFER, E.L. Performance of Tanzanian Secondary School Pupils on the Raven Standard Progressive Matrices Test J. Soc. Psychol. 1967. 72 (2) 205-215.

Performance of 3,692 Tanzanian secondary schoolboys on P.M. is analysed. Differences in mean level of performance were found to be associated with ethnic group (African or Asian), age, and sex of student, but were independent of form level and tribe or community groupings.

KLONOFF, Harry. An Exploratory Study and Analysis of the Wechsler-Bellevue Intelligence Scale and the Raven Progressive-Matrices. Master's thesis, University of Toronto, (Toronto, Ontario, Canada). 1951.

C. KNEHR, Charles A. Progressive Matrices Findings Associated with Cerebral Histopathology Percept. & Motor Skills. 1956. 6:249-54. December.

An apparently useful diagnostic indicator of histopathologic factors in intellectual impairment is described. Found in differential between obtained scores on Sets AB, B, C, D and E. of P.M. and normally expected scores based on performance on Set A. The indicator is observed to be a significantly lower than expected course on Set B. Where impairment is moderate a reversion to expected performance levels occurs in later sets. In 21 of 33 patients with known cerebral histo-pathologic changes, this score reversal was found. In six of more severely impaired individuals, significant loss on Set B occurred but reversion to expected performance did not occur on Sets C, D and E. False negatives were obtained in six patients with clinical evidence of cerebral histopathy. True number of false positives is difficult to estimate, from present data likely to be only a very small percentage of cases. Further studies needed.

C. KNEHR, Charles A. Thinking Impairment in Acute Schizophrenic Illness J. of Psychol. 1962. 53, 15-28.

A group of acute schizophrenic patients was compared with a matched control group on a battery of ten tests based upon Spearman's early work on the factors of cognition.

C. KNEHR, Charles A. Differential Impairment in Multiple Sclerosis . J. Psychol. 1962. 54, 443-451.

Three matched groups consisting of control subjects, ambulatory patients with multiple sclerosis, and patients with diagnoses of cerebral organic damage. The multiple sclerotics were significantly different from patients with other neurological conditions in the frequency or rather well preserved abstract intellectual ability in the presence of losses in other tested functions that equalled or exceeded those of the organic groups.

C. KNEHR, Charles A. Psychological Assessment of Differential Impairment in Cerebral Organic Conditions and in Schizophrenics J. Psychol. 1952. 54. 165-189.

Fifty patients with varying kinds of cerebral pathology and a control group of 25 individuals without known damage were examined with a battery of ten tests previously used with a group of schizophrenics. The battery included tests traditionally held to measure abstract conceptual activity, along with measures of other aspects of cognitive functioning. Individual performances on tests showing very significant group differences ($p = .001$) between normals and organics of the same age indicated that some impaired psychological functions accompany a variety of organic conditions with varying frequency.

KNEHR, Charles A. Factor Analyses of Schizophrenic and Organic Test Data J. Psychol. 1962. 54:467-71.

Principle components factor analyses with Varimax rotations were completed on data collected previously in the study of impairment in schizophrenics and organics. The factor patterns for the loadings of nine tests (including P.M.) were similar for the separate experimental groups.

C. KNEHR, C.A. Revised Approach to Detection of Cerebral Damage: Progressive Matrices Revisited Psychol. Reports. 1965. 17. 71-77.

The use of several indices based on Progressive Matrices performances alone fails to differentiate impairment related to psychopathology from that due to cerebral histopathological changes at a satisfactory level, although the test is an excellent indicator of the presence and extent of

the impairing condition. A case is made that while differences from expected scores on the P.M. can be useful indicators, there are a number of false positives which can best be eliminated by a further battery of non 'g' tests.

E. KNIEF, Lotus M., AND STROUD, James B. Intercorrelations Among Various Intelligence, Achievements, and Social Class Scores J. Ed. Psychol. 1959. 50:117-20.

The analyses reported in this paper give little justification for the use of the Davis Eells Games, Lorge-Thorndike nonverbal intelligence tests and Raven's Progressive Matrices in conjunction with the Lorge-Thorndike verbal intelligence tests for general prediction purposes. This in no sense denies their usefulness in individual diagnoses. In need of further exploration in particular is the significance of extreme discrepancies in performance on verbal and nonverbal intelligence tests.

A.E. KOSTRZEWSKI, Janusz and BIELA, Franciszek. Problem wspolzaleznosci Standardowych Metryc J.C. Raven Øraz skali Wechslera do badania intelligencji dzieci ("Interrelations between the Raven Progressive Matrices and the Wechsler Intelligence Scale for Children"). Przeglad Psychologiczny. 1970. 19. 81-94.

Measured interrelations between measurements performed by P.M. and W.I.S.C. to determine whether the relationships would be the same for results from 160 7-11 year old subjects and whether the two tests can be used interchangeably. Statistically significant correlations were found between (a) P.M. and Full, Performance and Verbal scales for all age groups (b) P.M. test measurements and the Information test for 9 and 11 year olds and (c) the Similarities test for 10 and 11 year olds and the vocabulary of 7,9,10 and 11 year olds, the Comprehension test in 8 & 9 year olds, vocabulary of 8 year olds, the Digit Span test in 10 & 11 year olds, the Picture Completion test in 8, 10 & 11 year olds, and the Object Assembly test in all subjects. It is shown that predicting results from W.I.S.C. on basis of P.M. test measurements and conversely is correct in 32.38% depending on the age group.

(In Russian with English summary).

KUMAR, Pramad. Intelligence and Student Leadership. J. Psychol. Res. 1967. 11 (2) 45-47.

P.M. was administered to two samples of students, 20 leaders and 20 non-leaders. The mean scores for the two groups were 45.05 and 45.1 respectively: the difference was not significant.

KUNDU, Ramanath and SEN, Anima. Matrices Score with Time Limit and Without Time Limit and its Relationship with Multiplication Score. J. Psychol. Res. 1964. 8 (3) 120-123.

The time factor is definitely a criterion of better performance in the Matrices Test and thirty minutes time is not an optimum time. But the correlation between two Matrices scores (with and without time limit) is very high (.97) which indicates that though the maximum scores cannot be ascertained within the time limit, the relative ability of the subjects may be fairly evaluated from their performance in half an hour with the Matrices test.

LANGEVIN, R. Is curiosity a unitary construct? Canad. J. Psychol. 1971, 25 (4), 360-374.

To test a hypothesis that curiosity is multifaceted, representative curiosity measures were compared. Two intelligence measures, the Otis and SPM, were also included to determine if the curiosity measure were distinct from IQ. The data for 195 sixth grade boys and girls were intercorrelated. Two weak curiosity factors emerged. On the whole, the curiosity measures were distinct from intelligence but were also distinct from one another.

A. LAROCHE, J.L. L'analyse des erreurs sur le Matrix 38. Bulletin du Centre d'Etudes et recherches Psychotechniques. 2. 161-174.

P.M. 38 was applied to 1900 boys of the Congo in such a way as to work out a differential analysis of the errors in relation to the total score awarded to the subjects. 50% of the correct answers to the items of the series A and B are evidence of a process of reproduction rather than that of education. The result is that P.M. 38 seems to be less a measure of the ability of subjects to reason by analogy than a measure of their capacity to readjust their perception of the demands of the test. The mental rigidity or agility of the subjects determines both the type of error and the total success of P.M. 38.

A. LAROCHE, J.L. Effets de repetition du Matrix 38 sur les resultats d'enfants Katangais. Bulletin du Centre d'Etudes et recherches Psychotechniques. 1959. 1-2. 85-99.

Effects of repetition of Matrix 38 were studied in the case of Negro schoolboys from the fourth, fifth and sixth primary grades in the industrial section of Upper Katanga. Split-half reliability is above .9, but unevenness of test items reduces the scope of theoretical conclusions. Improvement of performances with repetition of the test is accompanied by a change in the type of error made by the same subjects: intelligent errors replace the stereotyped reproduction of pattern in the matrix. Successive repetitions do not improve the scholastic validity of the test, which is practically nil for French and weak for Arithmetic.

A. LAROCHE, J.L. Recherches sur les aptitudes des ecoliers du Katanga industriel (Congo Belge). Le Travail Humain. 1960. 23.

200 sixth grade primary school boys underwent a battery of 18 tests of different kinds (including P.M. 1938). Results invalidate two of Dr. Verhaegen's theses. The observed intertest correlations vary in size and suggest a structuralisation of mental activity around the same traits as for Belgian school boys, the relative stability of performance is very good, the absolute stability by test-retest for predicting future global success were verbal tests in French. Author feels these tests can serve as valid selection tools for urban Katangan school boys.

C.V. LARSON, K.L. The Characteristics of Vocationally Successful Mentally Retarded Youth as described by Two Types of Intelligence Tests. Thesis, University of Oregon, 1964.

Study was attempt to describe characteristics of educable mentally retarded youth with successful work experience reputations, on in-school job situations and those with similar reputations on out-of-school job situations. Tests used were WISC & P.M. Subjects were 80 males divided into those with successful or poor work reports for both in-school group and out-of-school group. Null hypothesis that there would be no significant difference between successful and unsuccessful students were rejected for WISC Full Scale scores, performance scores and some of subtests. Test differences for each group are given. Study advanced P.M. as promising example of a performance type test might be used to help describe characteristics of a student who makes a successful vocational adjustment. This was only true for in-school sample.

C. LAZZERONI, V. and SIRIGATTI, S. Struttura della personalita e psicosomatosi; Nota preliminare. (Personality structure and psychosomatics; introductory note). Bolletino di Psicologia Applicata, 1969, 91-93, 91-96.

A detailed study was conducted regarding a group of syndromes traditionally regarded as psychosomatic. The following methods were used (a) questionnaires (b) MMPI (c) Rosenweig's P-F Test (d) Baum Test (e) PM'38 (f) a series of stimulations which permit the comparison of alpha rhythm modifications with respiratory and EKG modifications.

A. LEVI, M. and SEBORG, M. The study of the differences between mean scores on verbal vs non-verbal tests of intelligence (I.Q.) and versus academic achievements of institutionalised women drug addicts belonging to different racial and ethnic groups. Paper presented to California State Psychological Association, 24th Ann. Convention, 1971.

The entire population of a State institution for women drug addicts was given the SPM, The California Achievement Test and The Revised Army Alpha or Beta tests. Of the 335 subjects, 200 were White, 67 Mexican and 68 Black. Whites received average SPM scores higher than the other two groups. White literates scored better than White illiterates; similarly the Black and Mexican subgroups. Black and Mexican groups performed much better on the SPM and Beta than on Alpha.

LEVINE, Bert D. The Progressive Matrices 1938 and Its Relationship with Certain Subtests of the Wechsler Bellevue Intelligence Scale. Master's thesis, University of Texas, (Austin, Texas) 1953.

LEVINE, Bert and ISCOE, Ira. A Comparison of Raven's Progressive Matrices (1938) with a Short Form of the Weschler-Bellevue. J. Consult. Psychol. 1954. 18, 10.

S.P.M. and the Weschler-Bellevue (Comp., Vocab., and Block Design subtests) were given to 60 undergraduates. The P.M. appears to tap areas of intelligence most closely related to Block Design and not significantly related to Comprehension.

C.E. LEVINE, B. and ISCOE, I. The Progressive Matrices (1938), the Chicago Nonverbal and the Weschler Bellevue on an Adolescent Deaf Population. J. Clin. Psychol. 1955. 11. 307-308.

To evaluate use of 1938 Progressive Matrices test with deaf adolescents, the scores of deaf school resident students on this test were compared with their Chicago Nonverbal (N=36) and W-B I Performance Scale (N=41) scores. The r with the Chicago was .41, with the W-B .55 which was significantly above zero at 1% level.

LIEBEL, H. Analyse der Beziehungen zwischen Merkmalen der Holtzmann Inkblot Technique, Intelligenzkriterien und Massen der Sozialabilität. Ph. D. Thesis, Bamberg, 1972.

Reports the result of giving the Holtzmann and SPM to 50 subjects in the age range 15-18 years.

V. LINGWOOD, Joan. Test Performances of A.T.S. Recruits from Certain Civilian Occupations. Occupt. Psychol. 1952. 26. 35-46.

Performances on five tests of the educational standard gradings of 4,300 women in the Auxiliary Territorial Service, drawn from 17 different occupations, are presented. It is concluded that the women in the different occupations differed from one another more in the general level of their test performance than they did in their performance on individual tests.

V. LOKANDER, S. and MACHL, M. Sick Absence in a Swedish Company, Part IV. Acta Psychiatrica Scandinavia. 1964. 40, (4), 401-408.

In conjunction with a sociomedical investigation on absence due to sickness in a Swedish company, a psychological part was also carried out. The psychological variables were correlated with absence due to sickness. In addition to personality measures, fifteen items from Progressive Matrices were included. A correlation between the shortened Matrices and industrial injuries was found. ($p. < .05$).

C. LORANGER, Armand W. and MISIAK, Henryk. Critical Flicker Frequency and Some Intellectual Functions in Old Age. J. Gerontol. 14: 323-7.

Fifty female residents of homes for the aged, all between 74 and 80 years and free from eye pathology, neurological disorders and senility were given the following battery of tests: Critical flicker frequency (CFF), Porteus Maze, Wisconsin Card Sorting, Raven's Progressive Matrices, Digit Symbol and PMA reasoning. These tests chosen as performances on them declines markedly with age. All tests of intellectual functions except the Porteus Maze, correlated significantly with CFF. Relationship of CFF and intellectual functioning in aged is tentatively ascribed to a reduced central neural efficiency in old age which adversely effects both CFF and some intellectual functions.

C. LORANGER, Armand W., and MISIAK, Henryk. The Performance of Aged Females on Five Non-Language Tests of Intellectual Functions. J. Clin. Psychol. 1960. 16: 189-91.

50 subjects randomly selected from a total of 140 female residents aged 74-80 years were administered Porteus Maze, Wisconsin Card Sorting Test, Raven Progressive Matrices, Digit Symbol Test and Primary Mental Abilities Reasoning Test. There was considerable range on all the tests. With the exception of the Porteus Test, none of the aged persons performed as well as the average adolescent or young adult in the normative group.

E. LUNZER, E.A. Aggressive and Withdrawing Children in the Normal School: 2. Disparity in Attainment Brit. J. Ed. Psychol. 1960. 30: 119-23.

In recent article, Lynn put forward the view that anxious children tend to show a higher performance in reading as compared with arithmetic. A group of aggressive children and a group of withdrawing children were given tests of reading and arithmetic and disparity scores were compared. There is a strong tendency for the former to perform badly in arithmetic and Raven's Matrices. These results are discussed in light of available evidence.

E. MACARTHUR, R.S. An Experimental Investigation of Persistence in Secondary School Boys Canad. J. Psychol. 1955. 9, 1. 42-54.

21 measures of "persistence" were applied to 120 English secondary schoolboys and the results were factor-analysed. A strong general persistence factor emerged, and was found to contribute, along with intelligence to school achievement. (PM was one of the measures of persistence). The most important subsidiary group factors influencing persistent behaviour were (a) a factor indicating that different boys reacted differently in individual situations requiring persistence as compared with group situations where the subject could compare his performance with that of his fellows, and (b) a factor contrasting objective measures of persistence with ratings on the trait. For measuring the general persistence factor in normal adolescent boys, an 8-test battery (excluding PM) has been evolved which had, for this sample, a validity coefficient of .77 (theoretical validity .88), and which is administratively practical for research purposes.

A. MACARTHUR, R.S. Assessing the Intellectual Ability of Indian and Metis Pupils at Fort Simpson, N.W.T. Dept. of Northern Affairs and National Resources, Ottawa. 1962.

In October, 1961, a number of tests of intellectual ability hypothesized as 'culture-reduced' (including SPM and CPM), along with some conventional measures of intelligence and achievement, were administered to the Indian and Metis pupils attending school at Fort Simpson, North West Territories, with a view to identifying economical measures of intellectual potential, having less cultural bias than tests commonly used for this purpose.

Found that tests such as PM, SCRIT, Lorge-Thorndike, Nom-Verbal and Cattell test are better for this sample than the conventional tests of intelligence. Although the former tests are still considered to be culturally biased when used in this context they have indicated considerable intellectual potential among the Indian-Metis of Pt. Simpson and Faust, NWT.

PM is the single test clearly best meeting the criteria over the 4 groups studied. In addition, it has face validity, is interesting and is easy to administer.

A. MACARTHUR, R.S. Sex Differences in Field Dependence for the Eskimo. Intern. J. of Psychol. 1967. 2, 2, 139-140.

Berry found sex differences in field dependence in Temne and Scottish samples, but found no significant sex differences in field dependence in samples of Eastern Eskimo from Baffin Island.

MacArthur has duplicated this study with 2 samples of Western Eskimo pupils to whom was administered the Embedded Figures Test. Correlations between sex and Embedded Figures was near zero, thus supporting Berry's results.

While reliability checks on Embedded Figures were not made for these samples, the correlations between this test and SPM were .70 and .68 for the respective samples, suggesting reasonable reliabilities.

A. MACARTHUR, R.S. Some Differential Abilities of Northern Canadian Native Youth Internat. J. of Psychol. 1968. 3. 1. 43-51.

Paper looks at what abilities are least affected and what are most affected by differences in native and white backgrounds for several groups of Canadian native pupils. Emphasis is on a rationale to guide such studies.

In very general terms, the conservation and other Piaget-type tasks were least affected by differences between native and white backgrounds, with the group tests of reasoning from non-verbal stimuli next, while the v:ed group tests (except for written verbal memory tests) were most affected by background differences.

In summary, for two age-groups each of Eskimo and Indian-Metis pupils, in relation to two parallel groups of Whites, some evidence has been presented concerning abilities that these native peoples have developed in adapting to their own environments, and concerning measures of their potential to develop abilities likely to be useful in adapting to a more school based technological way of life.

A. MACARTHUR, R.S. Intellectual Abilities and Cultural Influences: Eastern Eskimos and Central Africans Condensation from a research Proposal of the same title presented to Canada Council, 1968.

A research plan is detailed for samples of Canadian Eskimos, Greenland Eskimos and Central Africans of ages 9 to 30 and of both sexes in comparison with Alberta Whites. One of the tests to be used is P.M.

A. MACARTHUR, R.S. Some Cognitive Abilities of Eskimo, White and Indian-Metis Pupils Aged Nine to Twelve Years Canad. J. Behav. Sci. 1969. 1, 1. 50-59.

Factor analysis of a number of ability tests (including P.M.) for Eskimo, White and Indian-Metis pupils aged 9 to 12 years, indicated for each sample two highly correlated oblique factors labelled v:ed and reasoning from non-verbal stimuli. When the native pupils were scored on white T-score norms, least ethnic differences and least decline with age relative to the white pupils occurred in the latter abilities. Written memory was an outstanding exception. There were almost no sex differences for any of the samples. Some

implications for practice and further research are discussed.

A. MACARTHUR, R.S., IRVINE, S.H. AND BRIMBLE, A.R. The Northern Rhodesia Mental Ability Survey 1963. Rhodes-Livingstone Communication No. 27, Rhodes Livingstone Institute, Lusaka. 1964.

Survey of 2671 students and workers tested over an 8 week period and given a battery of tests of various types (including PM).

A.E. MACDONALD, H.A. AND NETHERTON, A.H. Contribution of a Non-verbal Ability Test to the Educational Assessment of Pupils in the Cross-Cultural Setting of the Canadian North . J. Educ. Res. 1969. 62. 7. 315-319.

This study examines the Progressive Matrices and selected subtests of the Metropolitan Achievement Test Battery to discover if the Progressive Matrices can contribute to the educational assessment of pupils in cross-cultural setting. Pupils from Grades II and IV in schools in the Mackenzie District wrote the above tests during the spring term of 1966, and these test results are the raw data for this study. Factor analysis is used to analyse the data and the resulting factors interpreted in favour of the use of the Progressive Matrices in this setting.

McDONNELL, M.W. The Prediction of Academic Achievement of Superior Grade Three Pupils . Alberta J. Ed. Res. 1962. 8:111-8.

A sample of 178 pupils (from a Gr. V. population of 3,700 with an I.Q. of 120 or more on C.T.M.M.) were given three intelligence tests (Detroit 1st grade, C.T.M.M. - Short Form and Raven's PM) and the Primary Battery of California Achievement Tests. Except for the Detroit, all tests were given about the same time in Grade III, thus yielding mostly data on concurrent validity. The Detroit and the Matrices were the best predictors and had the only significant intercorrelations among intelligence tests. The Progressive Matrices predicted achievement (even language) better than C.T.M.M.

McLEOD, H.N., and RUBIN, J. Correlation Between the Raven Matrices (Rev. 1956) and the Wechsler Adult Intelligence Scale (1955). Ont. Hosp. Psychol. B. 1961. 6:47-9.

Correlation is slightly higher for males and proportional to level of intelligence. Regression allows prediction of Full Scale Score within 10 points in 73% of cases.

C. McLEOD, H.N. AND RUBIN, J. Correlation between Raven Progressive Matrices and the W.A.I.S. J. Consult. Psychol. 1962. Vol. 26 No. 2. 190-191.

Analysis of relationships between Matrices and W.A.I.S. undertaken at a psychiatric hospital. Subjects were day care, forensic and inpatients, mostly diagnosed as neurotic. Correlations given for W.A.I.S. total for whole group (.67), for male, (.78) and female (.54), as well as for Verbal and Performance scales for both sexes. Findings similar to studies by Desai (1955) and Hall (1957).

E. MADERNA, Alessandro M., AND VALSESCHINI, Silvio. Ricerca sulle capacita di previsione scolastica del P.M. 38 di Raven . ("Research on the predictive capacity of Raven's Progressive Matrices (1938) Test"). Bolletino di Psicologia Applicata. 1967. 79-82, 67-80.

Of 290 students who took P.M. 38 test on admission, only 139 successfully completed secondary school. These subjects were retested and divided into various groups according to scholastic achievement. A control group of 25 subjects from another secondary school were given the same test and W.I.S.C. on admission and at the end of their third year. Data obtained indicate that subjects with scores less than 18 on P.M. were likely to encounter scholastic failure, while 76% of subjects with scores over 35 would succeed. This confirmed hypothesis that it is possible to determine the existence of a minimum psychometric level below which the possibility of scholastic success of subjects examined is insignificant.

MAHER, Brendon A. Position Errors and Primitive Thinking in the Progressive Matrices Test . Am. J. Ment. Def. 1960. 64:1016-20.

Two groups of subjects, college students and mentally retarded children, were tested with

Raven's P.M. (1938). Frequency with which errors occurred in particular positions for both groups was computed for Sets A and B. Analysis of data obtained does not offer support for hypothesis that differences in intelligence lead to differential position preferences between the two groups. Such significant differences as were observed are more adequately explained by reference to the differential appeal of contents of given available error choices. Clinical use of P.M. for purposes other than obtaining a %ile score, seem to lack justification at present.

A.N. MAJUMDAR, P.K., DASGUPTA, J., BASU, K. and DUTTA, D. On the Working of a Battery of Psychological Tests: Raven's Standard P.M. Test. Bulletin of the Council of Social and Psychological Research, 1967, 9. 1-6.

Presents a normative study of Raven's Standard P.M. along with a few other cognitive ability tests on 2836 higher secondary students of Calcutta, India. Normative studies for different subgroups were undertaken and the order of placement of the different subtests of the test in the total scale continuum were verified. No significant difference in the overall difficulty value of set C with that of set D was noticeable. However, results indicate that set D might precede set C in the scale continuum.

A.V. MARTIN, J.C., GONZALEZ, R.B., DOMINGUEZ, F.M. and J.F., and VALENZUELA, M.B. Estudio estadistico del Test "Matrices Progresivas de Raven" escalas general y especial. Revista de Psicologia General y Aplicada, 1969, 24 (99-100) 1004-1013.

V. MASON, P.L., and CASEY, D.L. The Use of Psychological Tests for Selection Tabulating Machine Operators. Personnel Pract. B. 1969. 16: 39-41.

Five tests were given to 74 trainees in tabulating machine work. Criteria were rank in class and a rating of ability to do the job after six months on the job. Tests of verbal reasoning and mathematical ability yielded the highest correlations with the criteria. It is felt the tests were an aid in selection.

E. MATTALIA, C.S. Studio comparative dei processi mentali in un gruppo di studenti di scuola media. (Comparative study of mental processes in a group of junior high school students). Rivista di Psicologia Sociale e Archivio Italiano di Psicologia Generale e del Lavoro 1970, 37 (2-3), 139-172.

Presents a quantitative and a qualitative analysis of intellectual processes through the PM 38 and other

psychometric techniques in a group of students in a secondary school in Turin, Italy. It shows that the process of logical intelligence and those of creative potential evolve according to relatively independent lines.

The operative divergence between logical and creative processes seems to be bound more to the originality of the mental elaboration rather than the S's productiveness.

(French and English summary)

E.V. MEHROTRA, S.N. An Education-Vocational Guidance Project for Intermediate Students: A Follow Up Study. Indian J. Psychol. 1959. 34: 148-62.

Intermediate examination results of 186 college students were used to determine the predictive validity of tests in verbal intelligence and nonverbal intelligence, the Progressive Matrices test and tests of form and spatial relations. Validity of nonverbal tests was relatively low. Some consideration is given to the psychologically "fit" who failed the school achievement examination, the "unfit" who passed and the "unfit" who failed; recommendations are made for counselling these special groups. A factor analysis of psychological tests is included.

MOGENSEN, Alan. Raven's Progressive Matrices in Twelve Pairs of Uniovular Twins Brought up Apart. Scand. J. Psychol. 1964. 5 (1) 50-52.

Twelve Danish pairs of uniovular twins brought up apart were studied individually using the 1938 version of Raven's Progressive Matrices. Significant within pair correlations were found for raw scores and solving time pointing to a considerable influence of hereditary facts on such test performances.

E. MOHSIN, S.M. Plea for a Scientific Aptitude Test and a Preliminary Report of the Development of such a Test. Ind. J. Psychol. 1959. 34. 36-42.

A verbal intelligence test can not be used for screening pupils for the science course. Nor can a nonverbal abstract reasoning test be used for this purpose. Correlation studies of Raven's Progressive Matrices tests and the writer's V.I.T. support this contention.

E. MONTGOMERY, G.W. The Relationship of Oral Skills to Manual Communication in Profoundly Deaf Students. Amer. Annals of the Deaf. 1966. 11 (4) 557-565.

Three standardised tests of speech, lip-reading and intelligence were given to 55 deaf school leavers who were independently rated for speech, lip reading and manual communication by their teachers. The distribution of ratings showed an overwhelming preference for and fluency in manual rather than oral methods of communication. The inter-relationship of tests and ratings were examined in order to discover whether the alleged incompatibility between oral skills and manual communication is observable statistically. No negative correlation was found. Significant correlations were found between Standard Progressive Matrices and all other variables measured except that of Oral Comprehension.

V. MOORE, B.G.R., and PEEL, E.A. Predicting aptitude for Dentistry. Occup. Psychol. 1951. 25. 192-9.

Group of 40 5th grade dental students were tested for general verbal, nonverbal, spatial, manipulative and aesthetic abilities. Scores were correlated with success in dental courses. Maximum predictions of the criterion were obtained of order of .60. It is concluded that a test of general and spatial intelligence might be profitably used in selection of dental students.

A. MORGAUT, M.E. Note sommaire sur quelques comparaisons psychologiques entre les populations Africaines, Malagaches et Europeenes. Rev. Psych. Appl. 1959, 9, 195-206.

A. MORRISON, J.R. Bilingual and Monoglot Children in the Hebrides and Shetland Islands. Ph.D. Thesis, University of Edinburgh. 1945.

Progressive Matrices (1938) was used in a study of the intelligence and attainments of bilingual and monoglot children in the Hebrides and Shetland Islands respectively. Bilingual children, he concludes, are behind even in nonverbal intelligence - probably due to mental inefficiency inherent in the bilingual culture rather than differences in innate ability.

A. MOYLES, E.W. and WOLINS, M. Group care and intellectual development. Develop. Psych. 1971, 4 (3) 370-380.

Several hundred children in various group care programs were compared for cognitive development with children reared at home. The SPM was administered to groups of children in residence for 2 or more years in Israeli kibbutz youth groups and institutions, an Austrian children's village and Polish and Yugoslav homes. When compared with age-mates living with natural families, the group-reared children did not show any of the developmental deficiencies usually attributed to 'institutional' rearing. Similarly, there was no correlation between age of entry or length of stay in a group setting and performance on SPM.

C. MUNDY, Lydia and MAXWELL, A.E. Assessment of the Feeble-Minded. Brit. J. Med. Psychol. 1958. 31: Pt. 3 & 4. 201-10.

In this paper, attention is drawn to present method of assessing intellectual ability of the feeble minded and effort is made to clarify relationship between I.Q.s obtained from (a) W.A.I.S. (b) Stanford Binet, Terman Merrill Revision 1937, Form L and Raven's P.M. 1938. W.A.I.S. full scale results were compared with results on P.M. for different age groups. Differences were not pronounced, though those for age groups 16-20 and 51-60 years were significant. Latter is largely attributed to lower reliability of Matrices for younger and older age groups. Due to Wechsler and Matrices tests tending to show agreement, it is tentatively suggested that Stanford-Binet grossly underestimate intellectual ability of so called feeble minded, especially in higher age groups.

C. MYKLEBUST, H.R. The Psychology of Deafness. Grune & Stratton, New York and London. 1960.

In Chapter 5 ("Deafness and Mental Development"), the relationship between deafness and a wide range of intellectual measures is considered. The extent to which different types of test show impairment is compared. The unpublished study of Wright (1955) with deaf and hearing college students is quoted, showing no significant differences between groups.

A. NATALICIO, Luiz F. Aptidao geral, status, social e sexo: Um estudo de adolescentes Brasilerios e Norte Americanos. (General Aptitude, Social Status and Sex: A Study of Brazilian and North American Adolescents). Revista InterAmericana de Psicologia. 1968. 2 (1) 25-34.

Examines the relationship between social status and general aptitude in 320 fourteen year old Brazilian and North American subjects to determine if the variable culture affects the relationship. Data, obtained from administration of the Raven Progressive Matrices and from a review of studies done in U.S. and Brazil concerning the relation of social status and aptitude, indicate that culture is a significant variable.

E. NELSON, M.O. and EDELSTEIN, G. Raven Progressive Matrices, Nonlanguage Multimental Test and California Test of Mental Maturity: Intercorrelations. Psych. Reports, 1963. 13. 46.

Significant correlations were obtained among the three tests. It is suggested that the Raven Matrices may be useful in testing the intelligence of children with language and/or cultural handicaps since its correlation with C.T.M.M. is high ($r = .69$).

NICHOLS, John E. Jnr. Insight, Superior Intelligence and the Raven Progressive Matrices, Set E. J. Clin. Psychol. 1962. 18 (3) 351.

Additive and totality insight were discussed in relation to the mental test performance of one female subject on the Peabody Picture Vocabulary, W.I.S.C. and Raven Progressive Matrices. A discussion of Set E of the Raven was presented and the tests' ability to discriminate qualitatively among superior individuals was questioned.

NISBET, J D. Level of National Intelligence. Nature. 1952. 170, 852.

The results of the Scottish Mental Survey showed a small rise in mean intelligence test score in the 11 year old population, over a period of 15 years. Also the results established the existence of a negative correlation between intelligence test score and family size. In a random sample of 200 children aged 11, the correlation between size of family and score in non-verbal SPM was -.20, while correlation between size of family and score in the verbal Moray House test was -.30, the difference being significant at the .05 level.

These results support the hypothesis that the environment of the large family constitutes a handicap to verbal development and that this verbal retardation affects general mental development.

NISBET, J.D. Family Environment and Intelligence. Eugenics Review. 1953. XLV. 1. 31-40.

Hypothesis was that the environment of the large family tended to depress the environmental component of a child's intelligence test score. This was tested by 3 methods: (1) partial correlation of family size and verbal ability with intelligence held constant, (2) correlation of family size and several tests with different verbal loadings, (3) correlation of family size and intelligence at different ages.

For the second method, 2 non-verbal tests (PM and Jenkins Scale of Non-Verbal Intelligence I) were compared with 2 verbal tests (Moray House Tests 41 and 42). The difference between the correlation between family size and intelligence test score on Matrices test and on Moray House Tests was

significant at test score on Matrices test and on Moray House Tests was significant at .05 level; other differences were not significant. Reasons are suggested for the correlation involving the Matrices test being smaller than the others.
For the most part, the results were in accordance with the prediction that the non-verbal tests would show a smaller negative correlation with family size than the verbal tests.
By the 3 methods, the results supported the hypothesis, though other explanations are possible.
So the conclusion was that it seems that part (though not all) of the negative correlation of family size and intelligence test score may be attributed to an environmental influence on size of family on verbal development and through it on general mental development. At the same time, it seemed clear that the whole of the negative correlation could not be explained in terms of this environmental influence.

NISBET, John D. Family Environment: A Direct Effect on Family Size on Intelligence Occ. Papers on Eugenics. 1953. 8. Cassell and Co., Ltd.

The effect of family size on intelligence was investigated in 3 parts:

1). by partial correlation of family size and verbal ability with intelligence held constant,

2) by correlation of family size and several tests with different verbal loadings,

3) by correlation of family size and intelligence test score at different ages.

In a random sample of 200 children aged 11, the correlation between family size and score in the non-verbal Matrices Test was -.20, while the correlation between family size and score in a verbal Moray House Test was -.30, the difference being significant at the 0.05 level. These results support the hypothesis that the environment of the large family constitutes a handicap to verbal development and that this verbal retardation affects general mental development.

NICHOLS, John E. Jnr. Insight, Superior Intelligence and the Raven Progressive Matrices, Set E. J. Clin. Psychol. 1962. 18 (3) 351.

Additive and totality insight were discussed in relation to the mental test performance of one female subject on the Peabody Picture Vocabulary, W.I.S.C. and Raven Progressive Matrices. A discussion of Set E of the Raven was presented and the tests' ability to discriminate qualitatively among superior individuals was questioned.

NISBET, J.D. Intelligence and Family Size 1949-56. Eugenics Review. 1958. 49, 4, 201-202.

Compares intelligence test scores (on the Moray House Tests) and family size for samples in Aberdeen for 1949, 1950 and 1956.

A.N. NOTCUTT, Bernard. The Distribution of Scores on Raven's Progressive Matrices Test. Brit. J. Psychol. 1949. 40:68-70.

English norms for P.M. show a population that is positively skewed at 8 years, normally distributed at 9 years, and then has marked negative skewing from age 10. Comparison with scores of Zulu subjects ($11\frac{1}{2}$ - $15\frac{1}{2}$ years) tested in 1948, in neighbourhood of Durban. Found that over the age range where English norms are negatively skewed, the Zulu sample shows equally pronounced positive skewing. However, when the median scores are equated, distributions are very similar. For each there is change from a positive skewing when median score is 18 points to a normal distribution when median is about 25 points. Form of distribution of an age group sample appears more dependent on test than on group tested. A test like P.M. is not really suitable for making inferences about "true distribution" or "real" rate of growth of intelligence.

A. NOTCUTT, B. The Measurement of Zulu Intelligence. J. Soc. Res. 1950. (Pretoria). 1. 195. 206.

Five tests have been standardised for native school pupils, and two of them also for adults. The tests used were: Goodenough's Draw-a-Man

tests, Raven's Progressive Matrices, a Zulu Vocabulary Test, an adaptation of the Koh's Block Test. Norms are presented for each test individually; weighted norms are presented according to Wechsler's method, and used for combining the results of several tests into a single score. Adults are split into three groups - illiterate, literate and educated.

C. NYMAN, G.E. AND SMITH, G.J.W. Serial Performance Patterns in Raven's Progressive Matrices Scand. J. Psychol. 1960. I (3) 103-11.

Paper intends to characterise from a serial point of view the five subsequent scores in Raven's P.M. and to study significance of various serial types. (1) by employing parallelly a diagnostic instrument serial version of Stroop's colour word test (C.W.), (2) by correlating serial patterns in P.M. and ratings of temperamental traits. One P.M. pattern implied early, another late maximum performances - As predicted, the sequence of part performances in P.M. independently of total score, appeared to correlate with 'cognitive style' in C.W. test and with subject's observable behaviour in an interview situation.

C. O'CONNOR, N. The Prediction of Psychological Stability and Anxiety-Aggressiveness from a Battery of Tests Administered to a Group of High Grade Male Mental Defectives. J. Gen. Psychol. 1952. 46:3-17.

A number of tests of intelligence, performance and personality were administered to 104 high grade mental defectives. Scores on certain of these tests were intercorrelated. Two criteria were predicted: (1) Criterion of psychological instability. Suggested that unstable high grade defectives tend to be suggestible, clumsy and less intelligent than the stable defective. (2) Criterion of anxiety-aggressiveness. Two test variables gave best prediction of criterion with battery of tests - these were P.M. and S.P. Health's Walking Test of Locomotor Co-ordination. Suggested that high grade mental defectives who can be rated as anxious, tend to be less intelligent and more clumsy than the more aggressive defective. Correlation between the

two ratings suggest that the more anxious defective may tend to be more unstable. Intelligence and dexterity are correlated in the population tested and also anxious patient seems to be more suggestible than the aggressive.

C.V. O'CONNOR, N. AND TIZARD, J. Predicting the Occupational Adequacy of Certified Mental Defectives. Occupational Psychol. 1951. 25:205-11.

From a study of 104 high grade male defectives it is concluded that employability, as measured by ability to retain a job or meet with employer's approval or both, is partly a function of general locomotor co-ordination and dexterity, and partly a function of emotional stability. Two separate test batteries yielded multiple correlations of .669 and .674 with the criterion of employability. A multiple correlation of .52 was obtained when only the Rail Walking and Body Sway tests were used. The best predictors of employability selected by the square root method were in the first battery the Rail Walking Test and P.M.

C. OLÉRON, P. A Study of the Intelligence of the Deaf. Amer, Annals of the Deaf. 1950. 95 (2) 179-195.

Brief review is given of studies of intelligence of deaf children. Author points out discrepancies in the findings and suggests that the deaf are equal to the hearing in concrete mental functioning but that they are deficient in abstract intelligence. He administered Raven's Progressive Matrices (1938) to 246 deaf children between the ages of 9 and 21 years and found them to be markedly inferior in "abstract" intelligence.

A.E. OLSON, D.R. AND MACARTHUR, R.S. The Effect of Foreign Language Background on Intelligence Test Performance. Alberta J. of Educ. Res. 1962. 8, 1. 157-167.

The S.P.M., the Cattell Test of 'g', and the Lorge Thorndike Figure Classification, in that order, best met the criteria of (a) high loading on a general intellectual ability factor, with negligible group factor loadings, (b) no significant relationship with foreign language background and (c) moderate relationship with school achievement.

The Matrices Test also met the criteria of face validity and relative stability for bilingual children over the period Grade III to Grade VII.

A. OMBREDANE, A.
Principes pour une étude psychologique des noirs du Congo belge. L'Annee Psychol. 1951, 521-547.

A. OMBREDANE, A., ROBAYE, F. AND ROBAYE, F. Analyse de resultats d'une application experimentale du Matrix 38 a 485 noirs Baluba. Bulletin du Centre d'Etudes et Recherches Psychotechniques. 1952. 7. 235-255.

The authors analyse the results of matrix 38 of 485 Baluba negroes of at least 17 years of age, having had at least three years schooling, natives of a province in the Belgian Congo. Results. (1) Subjects aged 21-29 succeed less well than those aged 17-20. Those older than 29 obtain very low marks. (2) Marks improve as the period of schooling increases. This is particularly noticeable for those having 5-6 years of schooling. 3. It is shown that the time allowed for testing ought to be at least 40 minutes. A "no time limit" test is always the best solution if the maximum information from the test is to be obtained. 4. Beyond E10, only items E1 and E3 are still discriminatory; the result is that if it is desired to shorten the duration of the test, it would be possible to stop at D10 with no time limit. 5. The analysis of mistakes in the not difficult items leads one to the conclusion that in this case the subjects do not guess their answers but adopt a preferential solution, the "nearest pattern" solution. This type of solution disappears in subjects whose total marks are high.

ORME, J.E. A Comment on Estimating W.A.I.S. I.Q. from Progressive Matrices Scores J. Clin. Psychol. 1968. 24(1) 94-95.

Shaw rightly points out that as W.A.I.S. full scale I.Q.s correlate highly with P.M. scores, latter can be used as a substitute. But Shaw's table of I.Q. equivalents not generally applicable due to omission of age norms. Marked changes with age in P.M. scores. Better way of calculating I.Q. equivalents for P.M. is by using the %ile points of normal distribution curve. If use I.Q. scale with S.D. of 15 and age norms are calculated, this gives a scale directly comparable with the Wechsler. Writer has published such a table to subnormals using Coloured Progressive Matrices. Other norms in later paper.

V. ORTON, R. AND MARTIN, D.R. Psychiatric Screening of Medical Students. Lancet. 1948. 255: 321-3.

Purpose was to develop a screening battery of tests of prospective medical students. Tests used included (1) questionnaires dealing with family, academic and personal interests, background. (2) two intelligence tests (P.M. 20 minute version) and group test 33 of N.I.I.P. (3) More purely psychological tests. 40 students studied. Found women had significantly higher average of verbal intelligence (expected as selection of women is more intense). From results, authors suggest minimum of 135 on Group Test 33 to ensure more adequate students (i.e. I.Q. of 118). This has been shown by other workers to be minimum adequate I.Q. for success in Medicine. Final results compared with similar gradings by senior administrative officer on academic success in Medical School. Sufficient agreement found to warrant continuing research.

V. OXLADE, M. An Experiment in the Use of Psychological Tests in the Selection of Women Trainee Telephone Mechanics B. Ind. Psychol. & Personnel Practice. 1946. 2. 26-32.

Battery of seven tests was administered to 33 women trainee telephone mechanics. Results on Otis Higher Examination, Raven's P.M. (20 minute time limit) and A.C.E.R. Mechanical Comprehension test were found to be related to success in examinations held at conclusion of training. If existing employment procedures were supplemented by more objective results of these tests, selection of women for this type of training could be made efficient.

V. PAOLICCHI, P. Risultati dell'applicazione di un questionario di interessi professionali su un gruppo di adolescenti. (The results of the application of a questionnaire of professional interests to a group of adolescents). Bollettino di Psicologia Applicata. 1969. 94-96, 123-143.

Studied the professional interests of a group of adolescents. 435 13 yr. olds were given (a) SPM (b) Thurston's PMA (c) 16PF (d) Brainard's Occupational Preference Inventory and (e) a personal outline for the essential facts of family and scholastic character.

C. PARDO, F.M. La exploracion de la inteligencia en el nino sordumudo: Relaciones entre inteligencia y lengua je. (Exploration of the Intelligence of Deaf Mute Children: Relationship between Intelligence and Language Development.) Revista de Psicologia General y Aplicada. 1968. 94. 797-804.

Investigated intelligence of 72 14:17 year old deaf mute girls. All had completed at least two years of schooling. Tests used were Gessell's Geometric Figures Test, Memory of Cubes, Goodenough's Test, Raven's P.M., Figure Drawing and Wechsler's Performance Scale. On Wechsler's Performance Scale, intelligence ranged from normal to low normal with median of 93 range 69-110. Observations were subjects had a slow execution time on majority of tests, a deficient capacity for abstraction, and formation of concepts, good capacity for attention and perception and immediate memory and a problematic capability for adapting to new situations. Concluded that cause of retarded intelligence in many deaf mutes not affected by oligophrenia is not due to lack of verbal languate but to social isolation which defect imposed. (Text in Spanish.)

PARDO, L.C., DIAZ, L.A., HERNANDEZ VARGAS, C. and HERNANDEZ VARGAS, J.G. La relación estatura-inteligencia en un grupo de escolares de Guadalajara, Jalisco. (The relationship between height and intelligence in a group of students in Guadalajara, Jalisco.) Revista Mexicana de Psicologia, 1971, 5 (1), 11-13.

A positive correlation between height and intelligence was found in 98 Mexican 3rd grade children.

V. PARENTE, M. The 20 Minute Progressive Matrices Test Scores Analysis of 165 Boys of 14-16 years old. Unpublished report, Vocational Guidance Office, Naples. 1955.

Details are given of the Matrices results of 165 orphanage boys (14-16 years) used in a test battery by the Naples Vocational Guidance Office. Apart from the general applicability of the test, it is tentatively suggested that the mean score of the sample is lower than that of children from normal homes.

E.V. PATTED, G.M. A study of spatial ability in high school pupils and its relation to success in architecture course. Dissertation, Dept. of Psychological Foundations, NCERT, Delhi, 1967.

C. PAYNE, R.W. Thought Processes, Normal and Abnormal. Proceedings of the XIII Congress of the International Association of Applied Psychology. Rome. 1958.

Looks at some of the more specific aspects of cognitive function and gives some examples with scores on P.M.

PENROSE, L.S. and RAVEN, J.C. A New Series of Perceptual Tests: Preliminary Communication. Brit. J. Med. Psychol. 1936. 16:97-104 (Pt. 2).

An attempt has been made to construct nonverbal tests in accordance with psychological principles. Results provide information concerning mental processes of normal children or adults and of mentally defective individuals. By further adaptations, the same tests could be used for blind, deaf or otherwise physically defective subjects. Again, elements in almost every test can be rearranged by permutation. Material thus has an experimental value for studying reliability and influence of practice. Series itself regulates training. It can be used for purposes of retesting at comparatively short intervals. Tests form a homogenous series and so can be used for either r or Q technique.

PENROSE, L. Intelligence and Birth Rate. Occup. Psychol. 1939. 13, 110-125.

A general discussion of the various influences which bear on the relationship of birth rate and intelligence. Included is reference to data from 600 children on S.P.M., related to the occupation of fathers, showing that the children of professional and clerical occupational groups do better than children of the less skilled occupational groups.

C. PIERCY, Malcolm and SMYTH, V.O.G. Right Hemisphere Dominance for Certain Nonverbal Intellectual Skills. Brain. 1962. Vol. 85, Part IV, pp. 775-790.

37 unselected cases of unilateral lesion involving the parietal lobe were studied for incidence of constructual disability and performance on an intelligence test involving visual spatial perception but no manual performance. Two dyspraxic and two

control groups were compared on P.M. No difference exists between the scores of left and right hemisphere cases without constructional apraxia. R. hemisphere dyspraxics score significantly lower than L. hemisphere dyspraxics. The difference between each dyspraxic group and its control group was highly significant (P $<$.001).

E. POTTASH, M.E. An evaluation of Raven's Progressive Matrices for the measurement of certain ability, achievement, and personality factors in Junior High School. Unpub. Master's Thesis, Bryn Mawr College, 1968. Bryn Mawr, Pa. 19010.

The purpose of this study was to investigate the validity of Progressive Matrices (1938) in the measurement of (1) nonverbal ability, (2) mathematical achievement, and (3) persistence as a personality trait. PM first was administered individually to a preliminary sample of fourteen heterogeneous subjects, and then was administered to a homogeneous group of twenty low-achievers. A study of these results and a thorough assessment of variables in the preliminary samples were done. Finally, the test was administered to an eigth grade sample (N=235) and correlation studies were carried out using information available from the students' records and a personality questionnaire.

PRINGLE, R.K. and HAANSTAD, M. Estimating WAIS IQs from Progressive Matrices and Shipley-Hartford scores. J. Clin. Psychol. 1971, 27 (4) 479-481.

With hospitalised patients, SPM and Shipley correlated more highly with WAIS scaled scores than with WAIS IQs. A regression equation was developed to predict WAIS scaled scores from a combined Shipley-Raven score.

V. RAO, S. Narayana. Predicting Academic Achievement of Students in Science and Arts Colleges. Psychol. Studies. 1962. 7: 16-19.

Using four predictors with 220 students, achievement was reliably predicted. Best single predictor was found to be performance in pre-university examination.

V. RAO, S. Narayana. Prediction of Academic Achievement of Students in an Engineering College. J. Psychol. Res. 1963. 7: 114-7.

204 engineering students were given SPM and a verbal test. Results were compared with pre-university exam marks and first term marks. The best single predictor proved to be first term marks. A combination of three predictor variables, viz. 1st term marks, pre-university performance and SPM score can increase predictive efficiency appreciably.

V. RAO, S.N. Problems of Adjustment and Academic Achievement. J. Voc. and Educational Guidance. 1964. 10 (3) 66-79.

An abridged version of the Mooney Problem Checklist (in English) was administered to approximately 300 male undergraduate students in Madras State in 1962. Scores from P.M. and the verbal subtest of the College Qualification Test were also available as were records of student's previous academic performance. Predicted achievement was obtained via R based on the two mental ability measures and the previous school records. Over and under achievement groups were defined as above and below one standard error of estimate of this predicted level when actual achievement was known. The two groups did not differ on the P.M. - (nothing is here reported on the CQT Subtest). Underachieving students reported significantly more problems than did overachievers.

A. RATH, R. (1954) Correlation of Progressive Matrices with Verbal Intelligence Tests and Written Tests on some other Subjects. Ed. & Psychol. 1954. 1 (4-5): 20-5.

Progressive Matrices and a battery of verbal groups tests were given to 107 college graduates (taking a competitive examination). These two tests correlated .48. Correlations of the two tests with examinations in English, Arithmetic and General Knowledge are given, the verbal tests correlated higher than the Matrices in each case.

N.V. RATH, R. Standardisation of Progressive Matrices Among College Students. J. Voc. Educ. Guid. (Bombay). 1959. 5, 4, 167-171.

With a view to standardising P.M. (1938) on University students, 600 were given these tests. Two samples were used, 275 graduates and 325 undergraduates. There was no significant difference in the scores of two samples for each of the five sets, calculated separately, as well as in the total scores. The percentile points of present samples came very close to those of Raven's study. P.M. correlated significantly with Verbal Intelligence Tests and Arithmetic but did not correlate so well with English and General Knowledge. From the evidence presented here, it can be reasonably said that P.M. as nonverbal tests of intelligence are not affected by cultural or linguistic differences.

RAVEN, J.C. Standardization of Progressive Matrices 1938. Brit. J. Med. Psychol. 1941. 19: 137-50 (Part I.).

A progressive series of 60 matrices has been prepared and standardised for general and clinical purposes. It can be used as an individual or group test for children over six years of age and for adults. Series gives a five point %ile

grading irrespective of age of testee. The standard series makes no attempt to differentiate between individuals within these groups. Matrix test grades have been compared with Terman-Merrill I.Q.'s. Case notes show that the series differentiates clearly between genuine intellectual superiority and verbal fluency. Used with defectives, test will differentiate backwardness due to specific tests in reading, speech or education from genuine intellectual defect.

RAVEN, J.C. Testing the Mental Ability of Adults. Lancet. 1942. 242: 115-7.

Author discusses difficulties encountered in testing mental ability of adults under military conditions and advocates instead of usual types of intelligence test "perceptually presented tests of eductions", on which ability to succeed "depends neither on scholastic ability nor acquired skill but essentially eductive mental activity at the time of test". As an example of a test of eduction he describes P.M. Test. "A person is shown a part left out from a group of alternatives shown below, he is asked to choose the piece which completes it. A series of designs follow. Each presents a matrix of relations from which it is possible to deduce the nature of the missing figure". Experience with Matrix tests in British Army is discussed.

RAVEN, John C. The 1956 Revision of the Matrices Tests. Abstract. Bull. Brit. Psychol. Soc. 1957. (32). 3.

Following work with children on the first series of Matrices tests, it was necessary to reconsider Spearman's principles in the light of Gestalt theory and to design problems of type used in the Coloured Matrices in which discrete figures could be approached as an organised whole, appropriately orientated to the observer and his perceptual field. In 1956 edition of Matrices tests, problems have been revised to give a more uniform distribution of incorrect as well as correct choices. To this extent, it indicates why a person is failing and appropriate tests will assess more accurately the nature of his disabilities. Intercorrelations between Coloured Matrices, Terman-Merrill and Crichton Vocabulary Scales indicate the disadvantages of using only a simple test of "general intelligence".

C. RAVEN, J.C. and WAITE, A. Experiments on Physically and Mentally Defective Children with Perceptual Tests. Brit. J. Med. Psychol. 1939. 18: 40-3. (Part I.)

Group of physically defective children were classified according to defect, and to teacher's estimate of mental ability. Their standard scores on R.E.C.I. Perceptual Tests were compared with these classifications. Mentally defective children classified according to defect and progress in school.

Their perceptual test scores and Binet I.Q. were compared. Physically defective children on average differ littel from normals despite teacher's ratings of backward. Their mean scores were slightly below normal on group test but slightly above normal on board form of test. Mentally defective children had mean scores consistently and significantly lower than normal, though mean scores showed a regular increase with age on perceptual tests as is usual with S-B tests. Perceptual tests of education can differentiate between backwardness due to loss of schooling and mental impairment.

E.C. RICHARDSON, H.J. Adolescent girls in Approved Schools. Routledge and Kegan Paul, London, 1969.

In a chapter on assessment, the use of a number of cognitive measures is reported. In particular, comparisons of SPM with the Stanford-Binet are used to infer different personality types. In addition, sub-test deviations from expected scores also appear to have significance; those finding Set C harder than Set D seemed to be anxious girls who could not take pressure but identified with kindly authority.

A.N. RIMOLDI, H.J.A. Ensayo de Tipificacion de una Prueba Mental. (Progressive Matrices de Raven.) Publicaciones del Instituto de Psicologia Experimental, Universidad Nacional de Cuyo. 1945. 1. 3, 85-114.

The distribution of Matrices scores are given of 363 children aged 7-14. The standard deviation is greater at 9 and 12. It is observed that the best children seem to develop intellectually to a lesser degree than the more backward - perhaps reflecting a fault of the education system. Little effect due to cultural differences was noted. (Text in Spanish: Summary in English, French and German.)

A.N. RIMOLDI, H.J.A. Tipificacion de los Progressive Matrices de Raven. Publicaciones del Instituto de Psicologia Experimental. 1947. 2. 1, 3-25.

Having 1,680 subjects between 9 & 15, the Matrices test was given simultaneously to groups of 30 subjects. The means increase progressively with age except for the 14 year old girls. There is a difference significant at the 1% level between the boys and girls in the older groups. The standard deviations are larger between the 10 and 12 years of age. Sets C and D did not show much discrimination at these ages. (Text in Spanish. Summaries in English, French and German.)

RIMOLDI, H.J.A. Study of Some Factors Related to Intelligence. Psychometrika. 1948. 13, 27-46.

From factorial analyses of battery of 19 individual tests, seven factors were obtained, six of them being interpreted. Some of these factors are probably related to similar ones

isolated in different batteries by different authors. P.M. is loaded on some of factors as expected according to nature of test and previous experience with it. Loadings of the tests and of factors in second order factors are given. Expected that this extension of factor theory will be useful for isolation of more fundamental psychological parameters. Although at present difficult to evaluate precisely theoretical and practical implications of this aspect of factor analysis.

A. RIMOLDI, H.J.A. A Note on Raven's Progressive Matrices Test. Ed. & Psychol. Meas. 1948. 8: 347-52.

Comparison of values obtained by administration of P.M. in different populations, different countries and different testing situations shows that there is a strong similarity between these different studies. Author recommends its use as nonverbal test. Loadings of different sets in the different factors are related to perception constructions of wholes, memory, relations of right and left, speed of perception and a nonidentified factor seem to play a considerable part in actual solution of the items. As some of these factors are similar to those of other studies, we suspect they are basic components of psychological dynamics, beyond mere presentation of the problem.

A.N. RISSO, W.L. El Test de Matrices Progesivas (Raven) y el Test Domino (Anstey). Presented at Conference of Sociedad de Psicologia del Uruguay, Montevideo. 1961.

A description of test administration and details of results with 1,634 subjects aged 12-44 in Uruguay. Percentiles are given by age. The SPM and Domino Test were used in a student selection setting and their relative value is reported. Reliability of SPM was 0.88. (Text in Spanish.)

C. ROBERTS, A.C., METRICK, S. and ROWLEY, J. Factors in Behaviour of Certain Epileptic Children. Dis. Nerv. System. 1960. 21. 669-677.

6 children with "14 and 6" seizure pattern and with alexias, agraphias and deficient Raven scores (grade V) were placed on 5 mcg T3 and trained by special techniques for a period of 2 months when they were again tested on the Raven. In every case but one, the Raven score increased at least one grade level and in 3 cases it increased 2 grades, changing the mark from "deficient" to "average".

With or without teaching, it is shown that the Raven scores of 10 out of 12 patients improved on retesting, after the administration of T3, 5 mcg daily for at least 2 months. Raven scores do not generally improve if a 2 month interval elapses between testing.

A.N. ROCCO, Amelia M. Normas para el Test de Matrices Progresivas, Obtenidas Sobre una Poblacion de 5000 subjectos Adolescentes y Adultos Montevideanos. Presented at conference of Sociedad de Psicologia del Uruguay, Montevideo. 1961.

Norma for SPM are reported based on data from 5004 subjects in Uruguay aged 12-44, and given under timed conditions (45 mins.). Reliability was 0.87.

C. ROSENBERG, C.M. Young Alcoholics. Brit. J. Psychiat. 1969. 115, 519, 181-188.

A clinical and psychological study was made of alcoholics aged 30 and less. Psychometrics revealed high levels of neuroticism and anxiety, giving support to the clinical impression that they drank in order to relive symptoms such as loneliness, feelings of inferiority, anxiety and frustration. Results on SPM indicate that young alcoholics are of higher intelligence than the alcoholic controls. However, members of the younger group were on the average nearly 20 years younger than the controls.

C. ROSENBERG, C.M. Determinants of Psychiatric Illness in Young People. Brit. J. Psychiat. 1969. 115 (525) 907-915.

A study of the characteristics of groups of alcoholics, addicts and psycho-neurotics. The E.P.I., Cattell Anxiety Scale, and S.P.M. were administered. Although not statistically different, the addicts tended to be of higher intelligence than the alcoholics as measured by S.P.M. The mean intelligence score for the neurotics was intermediate between the scores for the other two groups.

C. ROSENTHAL, D., LAWLOR, W.G., ZAHN, T.P. and SHAKOW, D. The Relationship of some Aspects of Mental Set to Degree pf Schizophrenic Disorganisation. J. Person. 1960. 28. 26-38.

It was hypothesized that the Set Index, which had discriminated normals and schizophrenics without overlap in a study by Rodnick and Shakow (1940) would successfully discriminate levels of disorganisation within a group of schizophrenic subjects. Patients were given P.M. and the R.T. procedure. Set Index correlated .89 with mental health ratings ($p < .01$) and .26 with P.M. scores ($p < .05$) i.e. not significant.

C. ROTH, Martin and HOPKINS, Barbara. Psychological Test Performance in Patients Over Sixty: I - Senile Psychosis and the Affective Disorders of Old Age. J. Ment. Sci. 1953. 99: 439-50.

Tests were administered to 46 patients with affective disorder and 20 senile psychotics, drawn from a series of patients over age of 60,

admitted to this hospital. Results on one or more tests were obtained from 59 subjects. Ability of senile psychotics to define words and repeat digits was relatively well preserved in some cases, but on the Matrices test and a test for orientation and knowledge of public affairs, the group fell into two almost exclusive distributions. Test performance of general hospital patients indicated that age alone was not responsible for difference between the two diagnostic groups. These results support conclusion based on clinical and follow up studies that senile psychosis and affective psychosis are relatively independent disorders that are rarely associated.

RUDOLF, G. e M. The Kent and Other Tests Used on the Same Subjects. J. Ment. Sci. 1948. 44:452-8.

Kent Emergency Test was compared with Stanford-Binet, Farmer Hotoph 3 (or R) and Progressive Matrices. 557 subjects given Kent and Stanford Binet, 407 Kent and FH3 (or R) test and 600 adult males (soldiers) given Kent and Progressive Matrices. Individuals in each group scored higher on Kent test than on the other tests. Conclusion was that Kent Emergency Test cannot be used as alternative to Stanford Binet, Progressive Matrices or FH3 (or R) test as it does not record similar results on the same individuals.

V.

SCHNELL, Richard R. AND DWARSHUIS, Louis. Progressive Matrices: Scores and Time. Educ. & Psychol. Meas. 1967. 27 (2) 485-487.

Effects of untimed P.M. were investigated by comparing scores on it with scores on another nonverbal test of intellectual functioning - the timed Revised Beta. Both tests given to 31 residents of a rehabilitation centre. A negligible correlation was obtained between P.M. and time taken to complete it. Scores computed by subtracting P.M. standard scores from Beta standard scores were found to be positively correlated with length of time taken to complete P.M. This result suggests that use of time may be a variable to consider when using P.M. Research of others implies that this use of time might be related to personality factors.

C. SCHOENY, Lois A. A study of deaf adolescents with general measures of intellectual ability. Unpub. Master's Thesis, Univ. of Kansas. 1964. (see Goetzinger et al, Volta Review, 1967, 69.500-506)

The full WAIS, Terman Non-Language Multi-Mental Test and SPM were administered to 16 deaf adolescents and found normal intelligence on the Terman, SPM and WAIS Performance.

E. SCHURER, M. Porovnani hodnot nejuzivanejsich zkousek intelektu u dificulni mladeze. ("A Comparison of the Most Frequently Applied Intelligence Tests: A Study of Results Obtained with Problem Children and Delinquent School Teenagers"). Ceskoslovenska Psychologie. 1964. 8 (1) 24-34.

SCOTT, E.M. AND NISBET J.D. Intelligence and Family Size in an Adult Sample. Eugenics Review. 1955. 46, 4.233-235.

Among 11 year old children the correlation between non-verbal Matrices score and family size was shown to be smaller than the correlation between a verbal test of intelligence and family size. This difference was attributed to the effect of family environment.

This article looks at data in a study by Baird and Scott on 288 women given PM and WAIS (4 parts - verbal). Correlations are given for family size and scores in 2 intelligence tests (verbal and non-verbal). The results from the adult sample suggests that the effect of family environment may persist but it is probably less marked at a later age. For the adults, negative correlation between family size and intelligence test score was smaller (though not significantly smaller) for the non verbal P.M. than for the verbal test. Such a result gives support to the conclusion that environmental factors associated with family size exercise an influence on test performance, even among adults.

N. SEEGER, E. Das Problem des Funktionalen der Intelligenz. Psychologische Rundschau. 1954. 5. 2, 127-135.

Describes the use of SPM for German readers and gives details of grades, norms and normal score compositions based on the 1938 Manual. (Text in German).

SHANAN, Joel and SHARON, Miriam. Personality and Functioning of Israeli males During the Middle Years. Human Development. 1965. 8 (1) 2-15.

62 Israeli men, aged 39 to 61, of middle-class occupations and of European origin, were administered 5 cards of the T.A.T., the physiog cue test, 42 of these were also given the S.P.M. and 23 were given the Street-Gestalt test. Results showed a decline in personality variables related to ego strength and cathectic energy. Cognitive function, particularly flexibility of closure, showed decline, but to a lesser extent.

SHAW, Dale J. Estimating W.A.I.S. I.Q. from Progressive Matrices Scores. J. Clin. Psychol. 1967. 23 (2) 184-185.

Purpose was to establish efficacy of P.M. in the prediction of W.A.I.S. full scale I.Q. Subjects were 83 neuropsychiatric hospital patients. P.M. given as group test and within at least three days a full scale W.A.I.S. given individually. Co-relation of .83 between P.M. score and W.A.I.S. full scale I.Q.s. Regression equation for predicting W.A.I.S. full scale I.Q. was obtained and standard error of estimate calculated. Since P.M. has been well established by previous research an instrument with considerable reliability results of present study indicate it can be considered a valuable and economical substitute for W.A.I.S. when only an I.Q. estimate is required.

SHEPPARD, Charles: FIORENTINO, D., COLLINS, L. AND MERLIS, S. Raven's Progressive Matrices (1938): Normative Data on Male Narcotic Addicts. Psych. Reports. 1968. 23 (2) 343-348.

P.M. was administered to 396 narcotic users. Norms are given and concepts basic to validity and reliability of P.M. are tested. Significant shifts were found in item order in sets A, B, C & D. Differences were not considered crucial for each test, so total structure of test was supported by sample. Discriminative power of most items ranged from good to excellent. Answer 4 was chosen significantly more often than other alternatives as the wrong answer in sets C, D and E, identifying the possible operation of a positional distractor. Test-retest reliability content and concurrent validity coefficients were .8. Correlation of formal education with P.M. was .2.

C. SHEPPARD, Charles, FIORENTINO, Diane, COLLINS, Lois and MERLIS, Sidney. Performance Errors on Raven's Progressive Matrices (1938) by Sociopathic and Schizotypic Personality Types. Psych. Rep. 1968. 23. 1043-1046.

In an attempt to identify the existence of reasoning errors in psychiatric patients, the performance of male narcotic users defined as sociopathic (N=36) and schizotypic (N=34) by M.M.P.I. profile patterns was analysed for avoidable errors on P.M. An avoidable error was defined as a failure to solve an item whose difficulty level was within the testee's range of ability as measured by his performance. Construct validity was defined in terms of the intercorrelations of Raven's centile and item difficulty levels. Parametric and nonparametric tests of significance indicated that the schizotypic groups commit significantly more identifiable reasoning errors than the sociopathic group.

C. SHEPPARD, Charles, FIORENTINO, Diane, COLLINS, Lois and MERLIS, Sidney. Further Studies of Performance Errors on Raven's Progressive Matrices (1938). J. Psychol. 1969. 71. 127-132.

In an attempt to identify the existence of reasoning errors in psychotic patients, the performance of male narcotic users defined as secondary sociopaths (N=20) paranoid (N=19) and schizophrenic mixed type (N=15) by M.M.P.I. profile type was analysed for avoidable errors on P.M. Avoidable error was defined as failure to solve an item whose difficulty level was within testee's range of ability to solve as measured by his performance. Construct validity was demonstrated with regard to intercorrelations of P.M. %ile score, item difficulty levels and number of avoidable errors. Tests of significance t showed paranoid patients committed more avoidable errors than the secondary sociopathic and mixed schizophrenic patients, but no difference was noted between the mixed schizophrenic and secondary sociopathic patients

SIGEL, Irving E. How Intelligence Tests Limit Understanding of Intelligence. Merrill-Palmer. Q. 1963. 9:39-56.

Unsystematic analyses of intelligence test responses negate the relevance of other cognitive factors influencing I.Q. Differences in cognitive style variables such as labelling behaviour and categorizing

should be analysed. Analysis of errors on I.Q. tests and qualitative analysis of verbal content might help us understand the "Law" of intelligence. A study of errors on the Raven Progressive Matrices showed that at ages 9 and 10 there are sex differences in kinds of errors made.

A. SILVEY, J. Testing Ability Tests: Issues in the Measurement of Ability Among African Schoolboys. Conference Proceedings of East African Institute of Social Research. 1963.

The development of an effective administration of SPM with African children (from Bunganda and Salisbury) is described. Problems associated with timing and validity are discussed with reference to the effects of coaching and practice.

SINGH, D.K. Personality correlates of academic achievement of College students. Ph.D. Thesis, Patna University, 1967.

SINHA, Uma. A Study of the Reliability and Validity of the Progressive Matrices Test. Master's thesis, University of London, (London, England). 1950. Abstract: Brit. J. Ed. Psychol. 1951. 21:238-9.

Purpose was to investigate the reliability and validity of PM as an intelligence test for school-children.
Subjects were 310 children (140 boys and 170 girls) aged 8.0 to 13.0.
Results:
1. Reliability: with split half (corrected) 0.86; with Burt's analysis of variance 0.90; with Kuder-Richardson formula 0.90. (Average is 0.88, appreciably smaller than the figure given by Raven, using test-retest method).
2. Validity: Internal:- A factor analysis was carried out and the general factor accounted for only 36% of the variance.
External criterion:- (i) whole test:- the partial correlation between PM and results for another intelligence test amounted to only 0.54;
(ii) Item analysis:- Biserial correlation coefficients ranged from 0.2 to 0.8, averaging about 0.45.

For children over 10, there were too many easy items, doubtless because Raven's version was originally designed for use with mental defectives.

SITKEI, E.G. and MICHAEL, W.B. Predictive relationships between items on the revised Stanford-Binet Intelligence Scale (SBIS), Form L-M, and total score on Raven's Progressive Matrices (PM), between items on the PM and total scores on the SBIS, and between selected items on the two scales. Educ. and Psychol. Meas. 1966, 26, 501-506.

SLADEN, C.D. (Enfield College of Technology, Queensway, Enfield, Middx, England). Progress report on work with PM., 1970-71. Pers. Comm. 1972.

Work with children has been directed to studying the ways problems are solved, working from Piagetian expectations. It was hypothesised that, with the correct solutions removed, drawing of a correct solution would be easier than dictating to the E, since the latter involves verbalisation. No difference was found.

In a further expt. parts of the matrix were removed as well as the solutions (using Sets C, D, and E). It was not clear that this removal made problems harder.

Work has also gone ahead with writing a programme to process solutions to Matrices problems.

SLATER, Patrick. The Association Between Age and Score in the Progressive Matrices Test. Brit. J. Psychol. (Stat. Sect.). 1947. 1: 64-8.

Purpose of enquiry was to discover errors involved in treating association between age and psychological tests as rectilinear during period when men in Army, P.M. found to be more closely associated with age than other tests. Sample of 2,500 men used - 100 at each age from 18-42. Scores were found to decline gradually with age from average of 40 to just over 30. Only about 5.81% of total variance of scores due to age differences. Remainder due to differences within each group. Rectilinear regression accounts for 3.52% and Polynomial equation of 3rd order for additional 0.65%. As sample is large, this increase can be shown to be significant but too small to abandon simple assumption of rectilinearity for general purposes.

SLATER, Patrick. Comment on 'The Comparative Assessment of Intellectual Ability'. Brit. J. Psychol.(1948). 39: 20-1.

Evidence is presented which the author feels casts doubt on the conclusion which Raven arrived at in his paper (Brit. J. Psych. 1948., p.12-19) to the effect that the distribution of intelligence at maturity is not normal.

C. SLATER, Patrick. Scores of Different Types of Neurotics on Tests of Intelligence. Brit. J. Psychol. 1945. 35: 40-2.

Obsessionals, men with miscellaneous neuroses, anxiety states and hysterias (25 men in each group) were tested with Progressive Matrices, Cattell IIA and IIB and the Shipley

Vocabulary Test. It was found that men suffering from obsessional neurosis tended to be more intelligent than those suffering from other neuroses, but there were no significant differences between the other groups. Thus it is demonstrated that neurotics are heterogeneous as regards intelligence.

E. SLATER, Patrick and BENNETT, Elizabeth. The Development of Spatial Judgment and its Relation to some Educational Problems. Occup. Psychol. 1943. 17: 139-55.

Seven pencil and paper tests, used for measuring spatial judgement have failed to discriminate any ability other than general intelligence among two large groups of children chosen to be representative of the population attending publicly financed schools at the age of 11+ and 13+ respectively. The type of educational programme which is most appropriate to individual development is briefly described.

C. SMITH, Jean P. and FINK, S.L. The Relationship Between Physical Improvement and Psychological Factors in Chronically-Ill Patients. J. Clin. Psychol. 1963. 19, 289-292.

This study examined the degree to which the psychological variables of orientation, intelligence, personal adjustment, social adjustment and motivation relate to improvement or decline in physical mobility and independence. C.P.M. scores tended to be low for the left and right hemiplegics and high for fracture and arthritic cases.

A. SOROKIN, Boris. Standardization and Analysis of Progressive Matrices Test by Penrose and Raven. Unpub. Report, Zagreb, Yugoslavia. 1954.

An analysis of the Progressive Matrices (1938) results of a random sample of 299 Zagreb school children aged 13.6 to 16.6 for use as a standardization of the test for a vocational guidance centre. The results are negatively skewed for this group, the mean 37.2 (S.D. 11.3). Test reliability (split half method) is 0.96 and retest reliability (after six months) 0.82. The results include an item analysis showing a lack of discrimination by C12, E7, E8 and E12. The best item is D4.

SPEARMAN, C.E. Measurement of Intelligence. Scientia, 1938, 64, 75-82.

Discussion of the concept of 'g' as a factor which enters into all cognitive performance. It measures an activity called 'eduction' which consists in passing either from 2 items to their interrelation or from one item and a relation to the correlative item. Success has been achieved in measuring 'g' through the test devised by Penrose and Raven.

SRIVASTAVA, A.K. An investigation into the factors related to educational underachievement. Ph.D. Thesis, Patna University. 1967.

STINISSEN, J. De Waarde van de Progressive Matrices '38, Een Nieuwe vorm voor de Lagere School. (Value of Progressive Matrices 1938; a new form for the elementary school) Tijdschr. Studie and Beroepsorient 1956, 3, 106-124.

This article gives a survey of studies made on the quantitative aspects of the PM., especially on account of its reliability, validity and item analysis. These aspects together with time limits, distributions and norms have been studies on a group of 509 Dutch speaking children of Belgium taken from 27 classes in 14 elementary schools.

E. STRUHS, Isabel. The Relation Between the Raven Progressive Matrices Test and the Stanford-Binet in a Group of Gifted Children. Master's thesis, Fordham University (New York, N.Y.) 1956.

A. SULLIVAN, Arthur. Measurement of Intelligence in Different Environments. B. Maritime Psychol. Ass. 1957. 6:18-23.

Groups of 15 to 16 year old school children from 2 cities and a region of isolated settlements in Newfoundland were compared for performance on two tests of intellectual ability. The hypothesis that an inferiority of I.Q. in the isolated regions would be found on Wechsler- Bellevue Form I (which stresses numerical & verbal abilities) but would not be found on PM test was verified by the results. Correlation between the tests was low for city groups but fairly high (.719) for the isolated region group.

C. SUTTER, J.M., LUCCIONI, H. AND SCOTTO, J.C. Valeur des méthodes de mesure de l'intelligence: A propos d'une enquête menée chez des schizophrènes. Annales Medico-Psychologiques. 1969. 2, 439.

Summary of a paper delivered in Marseilles in which the authors comment on a discordance in results obtained from a group of 28 stabilised schizophrenics, when given the Wechsler-Bellevue, the Binois-Pichot and the S.P.M. They argue that there is no contradiction in the results, but that each test measures different aspects of intelligence and should ideally therefore be used together. (Summary in French).

E. SWINNEN, K. Een onderzoek met de Progressive Matrices '38 op een groep leerlingen van de zesde latijnse en zesde moderne. Tijdschr. Studie and Beroepsorient. 1958. 5. 13-25.

S.P.M. given to 180 boys, aged 12-13 years, doing an arts course. Predictive validity relating to scholastic attainment in first two years was .537 (Greek and Latin group) and .21 (Modern languages). Reliability was .85 and with correction for homogeneity this rose to .95.

C. SYDIAHA, Daniel. Prediction of W.A.I.S. I.Q. for Psychiatric Patients Using the Ammons' F.R.P.V. and Raven's Progressive Matrices. Psych. Reports. 1967. 20 (3) 823-826.

40 patients at a psychiatric hospital were tested with the following tests of intelligence: W.A.I.S., P.M. and Forms A & B of the Full-Range Picture Vocabulary Test (FRPV). Regression analysis using W.A.I.S. as the criterion and the other two tests as predictors indicated that either Form A or Form B of the F.R.P.V. predicted W.A.I.S. I.Q. but the P.M. did not.

C. SYDOW, Donald W. A Psychometric Differentiation Between Functional Psychotics and Non-Psychotics With Organic Brain Damage. Doctor's thesis, Uni. of Minnesota. (Minneapolis, Minnesota).

C. TAIBL, Raymond Martin. An investigation of Raven's "Progressive Matrices" as a tool for the psychological evaluation of cerebral palsied children. Doctoral Thesis, University of Nebraska, 1951.

Of 115 unselected cerebral palsied subjects who attempted the SPM, all but 1 completed it. Their performance was not significantly different from N. American children of similar age. The athetoid subjects were no different from normals, but the spastic group was significantly different from the athetoid group. A correlation of .715 was found with the Stanford-Binet for those subjects who performed on both tests.

C. TIZARD, J., O'CONNOR, N. AND CRAWFORD, J.M. The Abilities of Adolescent and Adult High Grade Male Defectives. J. Mental Sci. 1950. 96:888-907.

The Heath rail walking test, five intelligence tests and 12 subtests of the U.S.E.S. general aptitude battery were administered to 104 defectives, mean C.A. 20.9. Wide differences in standard deviations of test results show the invalidity of inferring defect from S.D.'s - especially on the Binet type vocabulary tests. On spatial ability this sample was one S.D. below mean of normal adults, on form perception $1\frac{1}{2}$ S.D. below, on finger and manual dexterity 2 S.D. below, on motor speed $2\frac{1}{2}$ S.D. below. At least 34% of the sample could be regarded as suitable for certain jobs falling under the categories apparently tested by the U.S.E.S. battery.

A.E. TORRANCE, E.P. AND JOHNSON, R.T. Gifted Thirteen Year Olds in Two Cultures: Greater London and Greater Twin Cities (U.S.A.). Gifted Child Quarterly. 1966. 10 (3) 125-131.

Mathematics achievement was investigated in 62 intellectually gifted American 13-year olds, and a similar number of gifted English children, the criterion for giftedness being a score of 55 or better on P.M. On the Co-operative Sequential Tests of Educational Progress in Mathematics, the American students had a mean score of 41.12, the English 40.24: the difference

was not significant. When questionnaire responses were examined regarding the reported time in outside study spent on mathematics, the American subjects mean was 10 hr/weekly and the English mean 2 hr./weekly. This difference was significant at the .001 level.

C. TRACHT, Vernon S. Preliminary Findings on Testing the Cerebral Palsied with Raven's Progressive Matrices. J. Except. Child. 1948. 15:77-89.

A number of cerebral palsied children and adults were given Raven's Progressive Matrices, a nonverbal test of mental ability. Results showed this test is particularly suited to persons so handicapped.

C. TRACHT, Vernon Sloan. A Comparative Study of Cerebral Palsied and Normal Adults on Two Forms of Raven's "Progressive Matrices". Doctoral Thesis, Loyola University, Chicago, 1958.

No significant differences were found between a group of cerebral palsied adults and a group of normal adults on either the booklet or the block form of the SPM. A very significant difference was found between the two groups (normal and palsied) in the time taken to complete the booklet form of SPM. This would strongly indicate that the time element is an important factor to consider in evaluating the overall findings of this study and the test results of cerebral palsied persons in general, whether children or adults.

A.E. TULKIN, S.R. AND NEWBROUGH, J.R. Social Class, Race and Sex Differences on the Raven (1956) Standard Progressive Matrices. J. Consult. Clin. Psychol. 1968. 32, 4, 400-406.

Standard P.M. was administered to 356 5th and 6th grade subjects to determine effects of past experiences related to race, social class and sex. All social class differences were significant while a racial difference was found only in the lower class. No sex differences were significant. Relationships between the Matrices and other measures (both standard test and family experiences) varied among the different race, class and sex groups. Future research must consider race, class and sex in its investigation of the usefulness of Matrices, and more generally experimental influence on intelligence and school achievements.

TULLY, G.E. Test-retest reliability of the Raven Progressive Matrices Test (Form 1938) and the California Test of Mental Maturity, Level 4 (S-F 1963). Florida Journal of Educational Research, 1967, 9, 67-74.

C. URMER, Albert H., MORRIS, Ann B, and WENDLAND, Leonard V. The Effect of Brain Damage on Raven's Progressive Matrices. J. Clin. Psychol. 1960 16: 182-5.

> Two groups, one control and one with a diagnosis of cerebro-vascular accident, were compared on W.A.I.S. and P.M. Results indicated that brain damaged subjects perform qualitatively as well as quantitively poorer on P.M. than control subjects. Total P.M. performance for brain damaged is depressed beyond any intellectual depression reflected in W.A.I.S. Qualitative changes are reflected by C.V.A. group being less consistent in responding to item difficulty as well as making figure ground reversal errors. Can be generally concluded that use of instruments which cease testing after a specified number of failures would penalise brain damaged individuals excessively.

A. VALENTINE, Max. Psychometric Testing in Iran. J. Ment. Sci. 1959. 105: 93-107.

> Intelligence scores on P.M. are lower in Iranian school and university populations than the expected norms and especially in nonwesternised groups. It is believed this is due to lack of training in perceptual analysis and logical reasoning. Traditionally there is a trend to speculative theorizing and this tendency is confirmed by results of "values" tests.

VANHOVE, A. and VERDONCK, P. J.C. Raven's Progressive Matrices '38 als Kwalitatieve Intelligentie Test. Tijdschr. Studie and Beroepsorient, 1955, 2, 61-79.

VEJLESKOV, H. An Analysis of Raven Matrix Responses in Fifth Grade Children. Scand. J. Psychol. 1968. 9. 177-186.

> Performances of 628 children on the Standard Progressive Matrices were studied by means of the average score in the five series of the test as well as by the time used for the whole test. The analysis considered differences with regard to sex, age and socioeconomic

status. Further, the individual items of the test were analysed with regard to the order of presentation and sex differences of response frequencies. Finally, the nature of the test and the application of a stochastic model are discussed.

V. VERNON, P.E. The Reliability and Validity of the Progressive Matrices Test. Admiralty Report. 14b. 1942

Correlations of the Matrices with good criteria of proficiency in various occupational groups of the Forces. Although other tests show a higher validity for specific jobs, the Matrices is the best single measure of the general ability which underlies all types of jobs. The above result only considers trainability. In ultimate efficiency, e.g. battle conditions, little is known. It was found, however, in a group of A.R.P. rescue men, that Matrices ability is still an asset, but that the ability measured by a vocabulary test is of little or no advantage. In factor content, the Matrices has the highest 'g' saturation, a very small amount of 'k' factor, but no verbal educational factor. Its main weakness is its rather poor consistency compared with most group tests of ability - i.e. the test performance is dependent on non-intellectual factors. The reliability of the Matrices test was assessed by comparing scores with the T_2 total. The number of divergencies seem insignificant.

VERNON, P.E. Psychological Tests in the Royal Navy, Army and A.T.S. Occup. Psychol. April, 1947. 1-22.

A review of psychological tests used in personnel selection during the war by the Royal Navy, Army and A.T.S. The Progressive Matrices is somewhat disappointing for vocational purposes, perhaps because: (1) the Services wanted intelligence and education rather than pure intelligence alone; (2) a battery of verbal and mechanical spatial tests yielded a better combined result than the Matrices alone, only when its visuo-spatial component was involved, did it seem to have anything to add to such a battery; (3) the main reason is its rather poor reliability and its susceptibility to nonintellectual influences - as Roberts has shown, this is greatest in the 15-30 score range, which is just about the level where acceptance or rejection for the Services takes place.

V. VERNON, P.E. The variations of Intelligence with Occupation, Age and Locality. J. Stat. Psychol. October, 1947. 52-63.

The Matrices scores of 89,764 Royal Navy candidates are tabulated under occupation, age and area of Great Britain categories. All factors other than individual occupation and age differences are relatively unimportant although statistically significant. Support is found for the suggestion that men in unskilled and labouring occupations tend to lose the mental capacities they possessed when they left school, and that men who make use of their intelligence retain it the best.

N.V. VERNON, Philip E. Occupational Norms for the 20 Minute Progressive Matrices Test. Occupational Psychol. 1949. 23:58-9.

Norms are given based on 89,764 men in different occupations and age groups.

V. VERNON, P.E. The Structure of Practical Abilities. Occupational Psychol. 1949. 23:81-96.

A review of approximately 100 unpublished factor analyses indicates that the major part of the variance of a miscellaneous battery of psychological tests may be attributed to g, in addition, abilities fall into two main groups, the v:ed: and K:m and these major group factors can be further subdivided into specialised factors. It appears justifiable to make the fullest possible use of g, k:m and ed tests for guidance purposes, but experience and attitudes need also to be considered.

VERNON, P.E. An Application of Factorial Analysis to the Study of Test Items. Brit. J. Psychol. Stat. Sect. 1950. 3:1-15.

Application of factor analysis to a set of test items will show whether content of test is homogenous or whether different items measure largely distinct abilities. Suggested that the general factor running through all items should be at least four times the variance of all significant bipolar factors if test is to be regarded as adequately homogenous. Heterogenity and formal factors constitute a serious problem as shown by the nonlinear regressions frequently noted in following up Army and Navy tests

during the war. If formal content varies significantly in a test given with time limits, items should be thoroughly mixed and presented in approximate order of difficulty, otherwise different levels of scores will measure different combinations of abilities. Formulae and tables are included.

V. VERNON, P.E. AND PARRY, J.B. Personnel Selection in the British Forces. London. University of London Press Ltd. 1949.

This is an account of procedures used and results obtained from application of scientific methods to personnel selection in British Forces during W.W.II. Part I is concerned with "the organisation of selection, the general procedures employed and the work of psychologists in the Royal Navy, Army and A.T.S., and the Royal Air Force. Part II is concerned with "the principles of personnel selection and guidance which have evolved both from pre-war investigations and from war time experience". Conclusions relevant to civilian psychology are contained in final chapter. An appendix lists main psychological tests used in forces.

WALTER, W. Grey. Brain Responses to Semantic Stimuli J. Psychosom. Res. 1965. 9. 51-61.

The probabalistic relation between stimulus association and anterior brain responses has been demonstrated and the development of the Contingent Negative Variation or "Expectancy Wave" has been found to follow very closely alterations in the significance of conditional stimuli. The inclusion of some response by the S. is essential but this does not have to be motor; in Several Ss a purely mental event, amounting to a simple decision, was adequate to sustain an E-wave. Results of using patterns taken from S.P.M. are reported.

C. WALTON, D. The Validity and Interchangeability of Terman-Merrill and Matrices Test Data. Brit. J. Ed. Psychol. 1955. 25:190-4.

Present experiment was designed to discover reasons for large discrepancies noted in routine testing of approved school boys between results of Terman Merril and P.M. tests. Results from 360 intermediate approved school boys, tested individually with Terman-Merril Form M, and in groups with P.M. (1938) were

compared with those from a clinic group of 301 children who had been tested individually with Matrices 1938 and Terman Merrill. When the two tests are administered individually, results show closer agreement than when Matrices is administered in group form. Reasons are suggested, e.g. children with personality problems react better to individual testing and so results are more valid. Discussion of results centres on lower Matrices grades, equivalence, administrative errors and the effects of giving the test individually.

WETHERICK, N.E. The Responses of Normal Adult Subjects to the Matrices Test. Brit. J. Psychol. 1966. 57 (3-4). 297-300.

Bromley (1963) drew attention to what he called "primitive forms of response to the matrices test" in his study with 35 hospitalised psychiatric patients between 40 and 80 years. His subjects consistently chose responses other than the correct one, making it appear they were using a consistent but incorrect method of solution - a primitive thought process. This was tested to see if it applied to normal subjects. Sample of 236 subjects from 20-69 and sample was above average in intelligence. If only relative difficulty of matrices and frequency with which particular wrong answers were selected, it appears results of Bromley's sample are typical of a normal population. Their choice of wrong responses was not due to age or mental abnormality except where either causes reduction in level of intelligence. Tables of results are given.

WETHERICK, N.E. Structure and Content in Concept Attainment. Effects of Varying Problem Content. Brit. J. Psychol. 1967. 58. 223-226.

Three equivalent forms of a concept-attainment task were employed on the hypothesis that both unfamiliar problem content and relatively familiar problem content would have the effect of reducing the efficiency with which problems were solved by comparison with neutral problem content. Assessment of nonverbal intelligence was with the SPM, with a time-limit of 15 minutes. The scores obtained must obviously not be regarded as adequate measures, but they do permit the subjects to be ranked.

A. WILTSHIRE, E.B. and GRAY, J.E. Draw-a-Man and Raven's Progressive Matrices (1938) Intelligence Test Performance of Reserve Indian Children. Canad. J. Behav. Sci. 1969. 1 (2) 119-122.

86 Canadian reserve Indian Children from 7-15 years were tested on the Harris-Goodenough Draw-a-Man and Raven's Progressive Matrices (1938) tests. The Raven mean I.Q.s were: girls 79, boys 85, not significantly different.
The tests were significantly correlated (raw scores r=0.67; I.Q.'s r=0.53).
Older children had significantly lower I.Q.'s on the Raven only.
These results caution against assuming that these tests, especially the Raven (1938) are "culture free" measures of intelligence.

WLODARSKI, Ziemowit Bledy w rozpoznawaniu figure geometry-cznych. ("Errors in distinguishing Geometrical Figures"). Przeglad Psychologiczny. 1960. 4. 89-99.

Results with 25 adults investigating the regularities in distinguishing geometrical figures showed (a) uneven increase by leaps of difficulty in distinguishing geometrical figures results from the gradual increase of the number of the distinctive features.
(b) a great difference between difficulty with 5 distinctive features and those with 6 features.
(c) a peculiar ease in the arising of disturbances in distinguishing figures according to their size.
(d) increase in the frequency of time errors in discerning figures, following the gradual complicating of the problem, even those that are quantitatively immeasureable.
(e) a lack of correlation between ease in discerning geometrical figures and results obtained on S.P.M. (Text in Polish, English summary).

WOLF, Willavene Sheets. The Contribution of Speed of Response in Mental Measurement. Doctor's Thesis, State University of Iowa, (Iowa City, Iowa) 1960.

Purpose was to investigate contribution of speed of response in intelligence tests to prediction of academic achievement and to attempt to improve predictive powers of PM and Leiter International Performance Scale by making time a part of the score. Tests given to a group of 5th grade school children. Hypotheses of study seemed to be supported as speed of response, when combined with number of right scores on PM and Leiter Scale scores increases correlation between these tests & Iowa test of basic skills (ITBS) and Lorge-Thorndike Test scores. However, correlations also showed that Raven and Leiter tests used here are not good predictive instruments. Assumption that speed of response would contribute to predictive value of test was borne out. Average time scores on items successfully completed correlated with criterion to almost same extent as number right scores.

WOLF, Willavene and STROUD, James B. The Contribution of Response in Mental Measurement. J. Ed. Psychol. 1961. 52:249-53.

To investigate speed of response as a factor in mental measurement, P.M. and Leiter International Performance Scale were administered to individual

sessions of 102 5th grade pupils and a time score determined for each pupil. Utilisation of the time values together with the conventional scores resulted in correlations between the two tests in question (P.M. & Leiter) and the two criterion tests, Iowa tests of basic skills and Lorge Thorndike, significantly higher than correlations obtained between the conventional scores alone and the two criterion tests. Further analysis of P.M. data of each 4th of items suggested that contribution of the time values increased from 4th to 4th of the items and thus with difficulty, through the 3rd 4th. Results imply that person who is able to deal more quickly with intelligence test items has more ability than the slower but equally accurate individual.

C. WOODSIDE, Moya. Instability in Women Prisoners. Lancet. 1962. Nov. 3, pp. 928-930.

A series of 139 women admitted to Holloway Prison between May 1st and October 31st, 1961, with sentences of 6/12 or longer, were interviewed and their records studied. 58 had a positive history of psychiatric disorder and evidence of instability was found in another ten. Social disorganisation, as manifest by irregular unions and illegitimate maternities was frequently concomitant with delinquency. Intellectually, there was a slight skew towards the lower grades.

E. WRIGHT, R. The abstract reasoning of deaf college students. Unpub. Doctoral dissertation. Northwestern U. Evanston, Ill. 1955.

For published reference to this material see: Goetzinger, Wills and Dekker. 1967, p. 501.

C. WYSOCKI, Boleslaw A. Assessment of Intelligence Level by the Rorschach Test as Compared with Objective Tests. J. Ed. Psychol. 1957. 48: 113-7.

An attempt was made to determine validity of the group Rorschach in assessing level of intelligence. Group Rorschach results were compared with verbal SP Test 15,(British Army), and nonverbal (P.M.) intelligence tests for men and women separately. Significant correlations from .272 to .450 were

found for Rorschach categories of: total number of responses, percentage of whole responses, percentage of human movement of responses, good form per cent, and percentage of animal responses. Correlations between poor form level and intelligence tests were not significant when calculated for men and women separately. Using a correlation matrix for men and women together, several corrected multiple correlations were calculated. Following Rorschach categories were best combination of scores for predicting level of "intelligence": number of responses, human movement, good form and animal responses.

A. WYSOCKI, Boleslaw A. and CANKARDAS, Aydin. A New Estimate of Polish Intelligence. J. Ed. Psychol. 1957. 48:525-33.

Aim was to produce recent and valid data on intelligence of Poles. Sample of almost 16,000 adults used, representing all classes and parts of Poland. P.M. (1938) used. Test results subjected to percentage analysis according to different military assignments educational levels, ages and occupational backgrounds. P.M. ranked various Polish groups in about same order as for similar English groups and assigned scores numerically comparable to corresponding English scores (and to scores of other intelligence tests in G.B. and U.S.A.) for comparable groups. Results show marked differences in intelligence levels of different groups caused by different factors, e.g. education, occupation, rural or industrial environment of age levels similar to those in intelligence testing of English speaking subjects.

A.E. YOUNG, Harben Boutourline, TAGIURI, Renato, TESI, Gino and MONTEMAGNI, Gabriella. Influence of Town and Country Upon Children's Intelligence. Brit. J. Ed. Psychol. 1962. 32:151-8.

The results of a relatively culture free intelligence test (P.M. 1956) applied to a random sample of 5th grade elementary school classes in Florence area (Italy) showed a marked superiority of town boys over boys from the country. This superiority remained significant for socioeconomic classes 4 & 5 after differences in social class distribution had been controlled. However, no differences between urban and rural girls were found. Possible explanations of the results are discussed and the importance of further enquiry is emphasised.

C. ZANGWILL, O.L. "Intelligence in Aphasia" in Rueck, A.V.S. and O'CONNOR, M. (Eds.) Disorders of Language. Ciba Foundation Symposium, Little, Brown & Co. Boston, Mass. 1964.

Performance on the Progressive Matrices test is not grossly impaired in motor aphasia, in jargon apraxia, or in amnesic aphasia, except in cases in which the speech disorder is associated with constructional apraxia.

3. Coloured Progressive Matrices (CPM) only

E. ALLEBACH, Nancy L. Raven's Coloured Matrices and Tests of Primary Mental Abilities with Young Children. Master's thesis, Pennsylvania State University. (State College, Pa.) 1954.

V. ANDERSON, R.P. Modification of the Raven Progressive Matrices for the Blind. Unpub. progress report, Project. 670-61-1. U.S. Office of Vocational Rehabilitation, 1961.

C.N. ANDERSON, Harry E., KERN, Frank E. and COOK, Charlotte. Correlational and Normative Data for the Progressive Matrices with Retarded Populations. J. Psychology 1967. 67 (2) 221-225.

Available data on 107 and 151 vocational and rehabilitation students were used to obtain correlational and normative information respectively. Information available included CPM, WAIS, & WRAT (Wide Range Achievement Test), scores with age and attained school grade level. Low to moderate correlations were found between grade level, intelligence and achievement variables. Substantial correlations were found between the sets of the CPM, between Wais V and WAIS-P (word recognition) and Arithmetic. CPM-WAIS correlations were higher with WAIS-P than with WAIS-V but actual proportion variance overlap ranged from .11 to .25. Normative data indicated that Set A of the CPM is least difficult and Set B most difficult. All score distributions were skewed negatively and the CPM total score distribution appeared best for determining individual differences.

C. ANDERSON, Harry E., KERN, Frank E., and COOK, Charlotte. Sex, Brain Damage and Race Effects in the Progressive Matrices with Retarded Populations. J. Soc. Psychol. 1968. 76. 207-211.

A sample of 147 educationally or mentally retarded persons were administered the CPM, the WAIS and the WRAT. Persons were classified on the basis of race, sex and brain damage. Race differences were found in WAIS V and the WRAT - WR while brain damage differences were determined in the WAIS - P, CPM total score and SPM - AB. The brain damage differences in the CPM - Ab test could not be attributed to varying achievement and intelligence levels.

C. ARCHIBALD, Y.M., WEPMAN, J.M. and JONES, L.V. Nonverbal Cognitive Performance in Aphasic and Nonaphasic Brain-damaged Subjects. Cortex. 1967. 3 (3) 275-294.

Examined performance of "aphasic patients on nonverbal cognitive tests" to determine if such performance is impaired by language disorder and whether performance on four tests used is affected differentially in attempt to relate severity of aphasia to degree of impairment in cognitive performance. 39 left and 32 right brain damaged patients with mainly cerebral vascular accidents were tested with Language Modality Test for Aphasia, Raven's Progressive Matrices, Shure-Wepman Concept Shift Test, Grassi Block Design Test and the Elithorn Mazes . Results show that more severe aphasic patients are impaired in their cognitive performance...(Aphasia) is specifically a defect of language and memory for language which may or may not be accompanied by impaired cognitive functioning ...the scores of right brain damaged patients are markedly inferior to those of the left brain damaged patients who were able to do this task.

C. ARRIGONI, G. and DE RENZI, E. Constructional Apraxia and the Hemispheric Locus of Lesion. Cortex. 1964. 1. 170-197.

Three groups of left brain damaged patients, N=70, right brain damaged patients, N=55, and control patients, N=50, were given a battery of constructive tasks.... Dyspraxic subjects were identified, taking as cut off point score obtained by normal subject with worst performance. All three tests indicated that constructive apraxis is significantly more frequent among right brain damaged patients. Severity of disturbance was not significantly different between the two hemispheric groups but certain qualitative differences were noted...When examined with a battery of intelligence tests dyspraxics proved to be more impaired than nondyspraxics, both in performance and verbal tasks; left brain damaged patients did worse than right brain patients on WB Verbal scale and on Raven's PM, no difference between the two hemispheric groups was found on W-B performance Scale.

A. BERLIOZ, L. Etude des Progressive Matrices faite sur les Africains de Douala. Bulletin du Centre d'Etudes et Researches Psychotechniques. 1955. 4. 33-44.

J.C. Raven's test of Progressive Matrices 1947 (Series A, Ab, B,) has been used on a sample of 80 African specialised workmen (however rudimentary their specialisation) of the Public Road Service of Douala (Cameroon), and the distribution of the erroneous answers permits the subdivision of the test in two groups of heterogeneous items.

A. BERRY, J.W. Temne and Eskimo Perceptual Skills. Int. J. Psychol. 1966. 1. 207-229.

The results of the study support the view that 'culture free' tests are unattainable: since people with differing cultures and ecologies tend to develop and maintain different sets of skills, then the concept of intelligence, or its equivalent is bound to be defined somewhat differently in each society. It follows from this that the search for a culture free test is futile insofar as it is hoped to find a universally valid test: although some tests might be used with fairness in a limited number of societies, this still leaves us with the problem of comparing the results between these 'test-fair' units.

A. BERRY, J.W. Ecological and cultural factors in spatial perceptual development. Canad. J. of Behav. Sci. 1971, 3 (4), 324-336.

Subjects from 8 subsistence level samples (e.g. Sierra Leone and Scotland) were given Kohs Block Design Test, a 6-item form of the Embedded Figures Test and Matrices. Results support a proposed model of spatial perceptual development. Age and sex differences were considered.

N. BRUNI, R. Working Percentiles based on 931 Italisn Children. Personal Communication. 1954.

Progressive Matrices (1947) Sets A, Ab, B - Results and working percentile points are given of 931 children aged 8-11 years (463 boys, 468 girls) from primary Italian schools.

C. CACERES, A. and MAURTUA, N. A proposito de las pruebas de inteligencia y la afasia. (On Intelligence tests and Aphasia). Revista de Neuropsiquiatria. 1968. 31 (2) 111, 121.

Sixteen 67 year old male and female in and out patients diagnosed as expressive, global and mixed aphasias, (88% from low socioeconomic levels and 84% with little education) were given several nonverbal tests: (1) the Human Figure Test in which 36% of subjects produced adequate representations, (2) the Bender Visual Motor Gestalt Test in which 28% of subjects revealed motor conservation tendencies and (3) PM in which 48% of subjects were considered mentally deficient. Need to account for other factors, etiology of illness, duration of development retraining methods, socio-economic antecedents etc.) was stressed.

E. CANTWELL, Zita M. The Performance of American Pupils on the Coloured Progressive Matrices. Brit. J. Educ. Psychol. 1967. 37 (3) 389-390.

727 elementary school students from a stable white Neighbourhood (school I) were compared to 807 students

from an unstable, primarily Negro neighbourhood (school II) on the Coloured Progressive Matrices. School I subjects had a higher performance level than School II subjects. Within each group, boys achieved higher mean scores than the girls.

E. CAROTENUTO, Vincenzo. Esami psico-attitudinali agli studenti dell'Universita di Napoli nell'anno 1964-65. (Psychoattitudinal Examinations of the University of Naples students in 1964-65). Bolletino di Psicologia Applicata. 1967. 79-82, 101-119.

C. CASHDAN, A. Problem-solving and Learning Sets in Normals and Sub-Normals. Bull. B.P.S. 1962. 46, 2A.

This study was designed to determine whether sub-normals would achieve better scores on CPM if required to make use of the verbal system, by having to justify their solutions. Two types of administration were used: the standard and the experimental (or 'verbal explanations'). No differences according to the type of administration were found either between groups or within groups.

CHEYNE, W.M. and JAHODA, G. Emotional sensitivity and intelligence in children from orphanages and normal homes. J. Child. Psychol. Psychiat. 1971, 12, 77-99.

Eighty orphanage children, 6-10 years old were matched with children in normal homes and tested for recognition of emotion in speech. Matching included use of CPM, with subgroup means at or below the 25th percentile level. The samples were predominantly children of unskilled manual workers. Recognition scores correlated with both verbal and non-verbal ability and correlations decreased with age.

C. COSTA, L.D., VAUGHAN, H.G., HORWITZ, M. and RITTER, W. Patterns of Behavioural Deficit Associated with Visual Spatial Neglect. Cortex. 1969. 5. 242-263.

Visual-spatial neglect as measured by an empirically derived response position preference score on the Raven CPM was examined in 70 patients with cerebral lesions and 63 controls. Patients with right cerebral lesions showed poorer CPM performance and a higher incidence of response position preference for the side ipsilateral to their lesions than did patients with left lesions. Position preference was significantly associated with homonymous visual field defects, constructional dyspraxia and in patients with left cerebral lesions mixed or receptive aphasia.

C. COSTELLO, C.J. Aphasic Cerebral Palsied Children's Wrong Answers on Raven's Progressive Matrices. J. Clin. Psychol. 1959. 15: 76-7.

Data are presented showing differences in the frequency with which a particular type of wrong answer on the Progressive Matrices is chosen by a group of cerebral palsied children with aphasia or related disturbances and a control group of post-polio children.

CURR, W., and GOURLAY, N. Differences Between Testers in Terman-Merrill Testing. Brit. J. Stat. Psychol. 1956. 9: 75-81.

Purpose was to compare size of mean and random errors made by trained and untrained Terman-Merrill testers. Eight professional psychologists and ten members of a psychology course tested random samples of pupils CA 8-9. Two testings with half sample tested by each at first testing and then interchanged three months later. Pupils also tested with Simplex Junior and Raven's Matrices about two months after first testing. Analysis of variance showed overall variance between tests barely significant at 5% level. Study made of relation between means of I.Q.'s and mean scores in Simplex and Matrices tests, but relation was not sufficiently linear to indicate which testers were testing high or low. Equivalence lines used to derive a set of norms for simplex and matrices tests and for Terman-Merrill vocabulary test at age level of testees.

E. DENMARK, F.G.W. An investigation of some problems in the education of partially deaf children. M.A. Thesis, University of Liverpool, 1953.

C. DILS, Charles W. The Coloured Progressive Matrices as an Indicator of Brain Damage. J. Clin. Psychol. 1960. 16: 414-6.

CPM protocols of 60 organic subjects were compared with those of 60 nonorganic controls. Equal proportion of each group were selected from a mental hospital and from medical patients in a long term hospital. Subjects with functional psychoses and idiopathic mental deficiency were excluded and the groups were controlled for factors of age, education, sex and race. A special scoring system was devised that correctly identified 82% of the organics and 92% of the controls. CPM shows promise of being a valuable instrument in the detection of brain damage, but the results of additional studies should be awaited before this technique is applied to general clinical use.

E. DUPONT, J.B. Correlations entre certain tests mentaux et réussite en lecture au debut de la scolarite obligatoire. (Correlations between certain mental tests and success in reading at the beginning of compulsory schooling). Enfance. 1967. 3-4, 299-312.

All pupils in the first two grades of two Swiss cities were given five tests, the results of which were compared with teachers' ratings. The tests were Verbal Mosaic, Raven's Progressive Matrices, Fay Test, Copying Pictures and Copying Designs. Validity is related to the method of instruction. The results involving the copying of Designs are considered especially noteworthy.

E. EVANS, L. A comparative study of the Wechsler Intelligence Scale for Children (Performance) and Raven's Progressive Matrices with deaf children. Teacher of the Deaf, 1966. 64, 76-82.

C. EVANS, R.B. and MARMORSTON, J. Psychological Test Signs of Brain Damage in Cerebral Thrombosis. Psych. Rep. 1963. 12: 915-30.

Study was made of 204 patients between 40 and 80 years: 108 had had a cerebral thrombosis and thus known to have damage to brain and 96 had had a myocardial infarction but no known brain damage. Two groups were compared on Rorschach Proverb Interpretations, Draw-a-Man, Bender-Gestalt, Raven Coloured Matrices and WAIS Digit Span and Vocabulary Tests. Each test distinguished successfully between cerebral and cardiac patients; each test divided at its optimum point, correctly classified more patients than could be expected by chance; a significant association between diagnosis and scores on each test was shown by contingency coefficients; positive relationships between every test (except Digit Span which was not calculated) and such of the other tests was shown by Spearman rank correlation ranging from .39 - .81. In view of the number of patients misclassified concluded that none of the tests could be safely used by itself for individual diagnosis.

C. EVANS, R.B. and MARMORSTON, J. Scoring Raven's Coloured Progressive Matrices to Differentiate Brain Damage. J. Clin. Psychol. 1964. 20 (3) 360-364.

CPM responses of 71 brain-damaged and 60 non-damaged patients were used to compare four methods of scoring that test: raw score, a consistency score, a scatter score and items reported as discriminating. The groups were controlled for factors of age (mean 59) education (mean 8.5), sex and race. Each of the four methods successfully differentiated the two groups; correctly classified more patients than could be expected by chance; was significantly related to diagnosis (cerebral

thrombosis vs. Myocardial infarction); and was positively related to each of the other scoring methods. At least with these older patients, the simple raw score was as useful as more elaborate scoring schemes.

E. FISHER, B. The social and emotional adjustment of children with impaired hearing attending ordinary classes. M.Ed. Dissertation, University of Manchester, 1965.

E. FOGELMAN, K.R. Modern Mathematics and Intelligence Tests. Educational Research. 1968. 11 (1) 71-73.

Investigated the effect on intelligence tests of previous experience with certain mathematical materials and topics. Five classes of 7-8 year old English children were given training for two terms with an apparatus designed to promote familiarity with the grouping of objects according to their attributes. Six classes of comparable children constituted the controls. Of those completing a picture test pretest as well as post tests consisting of the Lorge Thorndike Intelligence Test and P.M., experimental group (N=61) scored significantly higher than control group (N=86) on Lorge Thorndike test. On P.M., scores of experimental group were also higher but not significantly. It is emphasised that due to methodological weaknesses, including a different pretest and a small and possibly atypical sample, results should be interpreted cautiously. However, it is concluded that experience such as that given to the experimental group seems to improve scores on intelligence tests requiring skills similar to those fostered by this experience.

FREYBURG, P.S. The Efficacy of the Coloured Progressive Matrices as a Group Test with Young Children. Brit. J. Educ. Psychol. 1966. 36. 171-177.

Coloured Progressive Matrices test has proved to be a useful nonverbal instrument apart from some doubts concerning its reliability. A pilot investigation gave reason for the belief that the test could be group administered with higher reliability than had hitherto been reported. The test was administered to 159 6-7 year olds, coefficients of internal consistency and stability being .89 and .87-.76 respectively. Relationship of Matrices scores with those obtained from other instruments are quoted, together with score distributions and directions for group administration with young children.

E. FROST, Barry P. Anxiety and educational achievement. Brit. J. Educ. Psychol. 1968, 38 (3) 293-301.

This paper reports a study of the relations between anxiety and educational achievement in 310 11-year-old junior school pupils (170 boys, 140 girls). The instruments used were the Frost Self Description Questionnaire (which includes seven anxiety scales and a Denial scale), the Junior Eysenck Personality Inventory, Progressive Matrices, Crichton Vocabulary and three NFER tests of reading and arithmetic. Product-moment, additive multiple regression and Principal Components (with Varimax rotation) analyses are reported.

C. GAINOTTI, Guido. Les manifestations de negligence et d'inattention pour l'hemispace. Cortex. 1968. 4, 64-92.

All the patients with unilateral brain damage admitted to our clinic during a 15 month period were given a battery of tests with the aim of detecting the possible existence of unilateral spatial agnosia. In the same patients, investigations were carried out to study somatosensory and visual field defects, general mental impairment, unilateral alterations of the body schema disturbances of eye movements and modifications of the personality. CPM was among the tests used. All tests indicated that ASU is significantly more frequent among right brain-damaged patients.

C. GOETZINGER, M.R. and HOUCHINS, R.R. The 1947 Coloured Raven's Progressive Matrices with Deaf and Hearing Subjects. Amer. Annals of the Deaf. 1969. 114 (2) 95-101.

Forty deaf and 40 hearing children of elementary school age were administered Raven's 1947 Coloured Progressive Matrices. Comparisons between groups on the scores were conducted for CA, sex and method of directions (pantomime vs. verbal). With regard to questions posed and in terms of age levels studied (CA's of 6-1/2 to 8-1/2 years) it may be concluded: (1) That the deaf and the hearing do not differ significantly on this measure. (2) That sex is not a factor in performance of the deaf on this test. (3) That performance is not significantly affected by the medium of directions. (4) That hearing males appear to be superior to hearing females. Was hypothesised that this finding could reflect differences in experiences contingent on cultural influences rather than any innate differences in ability.

N. GREEN, M.W. and EWERT, J.C. Normative Data on Progressive Matrices (1947). J. Consult. Psychol. 1955. 192, 139-142.

No significant difference was found between scores obtained by a slide form of administration compared with the book form. The median scores of the Rochester (U.S.A.) children are consistently higher than Raven's Dumfries figures. The overall correlation with age is high (0.55) also that with Otis Mental age (0.78). But correlation with three different standard group intelligence tests only moderate (average 0.40). The Matrices correlated more with verbal than nonverbal tests and therefore cannot be thought of as a test of nonverbal reasoning alone.

E. HARRIS, Dale B. A Note on some Ability Correlates of the Raven Progressive Matrices (1947) in the Kindergarten. J. Ed. Psychol. 1959. 50: 228-9.

The intercorrelations of scores on the Raven Progressive Matrices (1947) the S.R.A. Primary Mental Abilities Test, and the Goodenough Draw-a-Man Test are presented. These are based on the individual testing of 98 kindergarten children selected to represent the urban population of the United States.

E. HAZARI, Anandi. The Stability of Raven's Coloured Progressive Matrices Scores for Selected Children. J. Psychol. Research. 1960. 4: 102-4.

80 elementary school children with poor school records were given the Progressive Matrices. Two different analyses have been presented which demonstrate that scores on the Coloured Progressive Matrices are relatively stable for children with very poor scholastic achievements.

A. HIGGINS, Conwell and SIVERS, Cathryne H. A Comparison of Stanford-Binet and Coloured Progressive Matrices I.Q.'s for Children with Low Socioeconomic Status. J. Consult. Psychol. 1958. 22: 465-8.

In group of 789 children of low socioeconomic status with age range 7-9 years 11 months, no evidence to support hypothesis that social biases in verbal items of SB depressed SB I.Q. below nonverbal, non-socially based, coloured Raven P.M. I.Q. Mean SB I.Q.'s were similar for Negro and white children boys and girls and for grouping within the three age levels. CRPM discriminated on basis of colour as negro mean scores were all lower than white means. No significant difference found for white children between SB IQ containing many verbal items and nonverbal CRPM IQ.

However, negro children's CRPM IQ means were significantly lower than SB means. Suggested that CRPM cannot be considered test of intelligence or measure of 'g' but a measure of a specific skill. Findings suggest intelligence tests heavily loaded with nonverbal items may discriminate against negro children.

C.E. HINE, W.D. Adapted Performance Tests for Assessing the Cognitive Abilities of Cerebral Palsied Children with Impaired Hearing. Unpublished Progress Report. Dept. of Audiology and Education of the Deaf, U. of Manchester. 1969.

JACOBS, P.I. and VANDEVENTER, M. Progressive Matrices: an experimental, developmental, nonfactorial analysis. Percept. Mot. Skills, 1968, 27, 759-766.

The CPM appeared to confound 'pure' inductive ability with ability to imagine how a response alternative would look if inserted into the pattern. A new test format was developed to eliminate the role of the latter by having the S judge the correctness of already completed patterns. Dramatic increases in test score were found.

JACOBS, P.I. and VANDEVENTER, M. Information in Wrong Responses. Psych. Rep. 1970. 26 (1) 311-315.

Under some circumstances the wrong responses a subject makes on a test may contain important information. In this study, the notion of facet design provided a systematic method for a priori ordering of the distractors on CPM as to degree of correctness. A score based on type of distractor chosen was shown to have a moderate degree of test retest reliability, concurrent and predictive validity, and cross-cultural applicability. The results suggest a re-examination of Sigel's finding that type of error and total score are unrelated.

JAIN, K.S.P. An organismic Study of Cognitive Errors. Manas. 1964. 11 (2) 105 113.

In mental development, dominant errors in earlier stages are of perseveration and orientation type. In later stages, particularly in the age group of 5-6, distortion type is predominant, O and P types having been controlled. At higher stages of development, integration errors are dominant. This pattern of errors at different levels are explained by the principle of hierarchization of functions. Both on the P.M. and on the Bender-Gestalt, the marked difference in the groups was in the subordination of integration errors. The results serve the purpose of pointing out a method for comparing error patterns at two different levels of cognitive organisation.

JASPAR, J. Un test de calcul mental a l'ecole primaire, etude Psychometrique et genetique. (Mental calculation test at primary school, a psychometric genetic study.) Bulletin de Psychologie Scolaire et d'Orientation, 1970, Vol. 19 (4), 180-194.

In 2 studies on Raven's Progressive Matrices and the D48 Test, the general intelligence factor and non-verbal intelligence were analyzed to give a double dimension to the tests. A psychometric dimension, using the classic grading system, and a clinical dimension for the ascertaining of the genetic stage (synthetic operatory, or formal) reached by the child. This 2nd test dimension makes it possible to reach the thought structure of the child besides the psychometric position in relation to the average.

A. JENSEN, Arthur R. Statistical Note on Racial Differences in the Progressive Matrices. J. Consult Psychol. 1959. 23. 272.

Criticises an interpretation in article by Sperazzo and Wilkins (1958) - analysis of variance scores on P.M. Authors say measured differences in scores between races are related to age, sex and socioeconomic status of subjects, results cannot be interpreted as showing differences in intelligences in races tested here. Jensen says this interpretation is incorrect. Did an analysis of variance for all interactions and found race difference was highly significant statistically. Actual magnitude of race difference may be small even though difference is highly significant. Better to do analysis of variance on the three socioeconomic groups separately.

C. JOHNSON, J.E. and OZIEL, L.J. An Item Analysis of the Raven CPM Test for Paranoid and Non-Paranoid Schizophrenic Patients. J. Clin. Psychol. 1970. 26, (3) 357-9.

An item analysis was made of the results of 200 mental hospital patients on the Raven CPM. Paranoid schizophrenic subjects did not differ from non-paranoid schizophrenic subjects in their performance on the test. The CPM may lack the discriminative power to be considered a valid measure of intellectual reasoning in schizophrenic subjects for this population.

JORDAN, Thomas E. The Utility of the Coloured Progressive Matrices. Doctor's thesis, Indiana University (Bloomington, Ind.) 1955.

JORDAN, Thomas E. Formboard Comparability in the Coloured Progressive Matrices. J. Clin. Psychol. 1959. 15: 422-3.

This study compared test scores on the booklet form of the Coloured Progressive Matrices with a new formboard version. The reliabilities of the two forms were comparable

and the difference between the mean raw scores of the two forms did not approach significance, so it is concluded that booklet and formboard versions are comparable. Both scales produced low correlation against Stanford-Binet scores.

JORDAN, Thomas E. and BENNETT, Carson M. An Item Analysis of the Coloured Progressive Matrices (1947). J. Consult. Psychol. 1957. 21: 222.

The Coloured Progressive Matrices was administered to 200 children entering first grade, using as an index of discrimination "the conventional upper and lower 27% technique". The item difficulties were determined by an item count of correct responses. One finding was that 25 of the 36 items on the Coloured Progressive Matrices "satisfactorily discriminate, but only 4 fall in the suggested difficulty range. 22 items appear to be too difficult for the age group studied. The data suggest that the test is of less value for lower age groups".

KENCHAVEERAIAH, B. and MENON, A. Relationships of Intelligence and Fluency Among Students. Indian Psychol. Review. 1968. 4 (2) 123-125.

Cattell's test of Fluency and CPM were administered to 35 boys and 35 girls, 9-12 years of age. The picture test showed $r = .003$, Word Series, $r = .192$ and Completing forms $r = .503$ with PM scores. The first two r's were not significant but third r was. No sex differences were found on the fluency scores ($t = .467$).

KHATENA, J.A. A Study of Comparative Performance on the Raven's Coloured Progressive Matrices and the Goodenough Draw-a-Man Test in two Singapore primary schools. Unpub. M.Ed. thesis. Uni. of Singapore. 1964.

The relevant content of this thesis may be found in Khatena "Cross cultural measurement of intelligence with the DAM and CPM". Gifted Child Quarterly. 1967.

KHATENA, J. A Study on the Reliability of the Raven's Coloured Progressive Matrices 1947. 1964.

CPM was used with 461 Singapore Primary School children and a year later, a retest was given to 292 of the 461 children. CPM operates most effectively on the 9-10 years of age group. Split half reliability shows values ranging from .82 to .99 and test-retest reliability from .21 to .64, with .71 for the total group.

A. KHATENA, Joe and GOWAN, J.C. Crosscultural Measurement of Intelligence with the DAM and CPM. Gifted Child Quarterly, 1967. 11 (4) 227-230.

Goodenough Draw-a-Man Test and Raven Coloured Progressive Matrices were administered to students in Singapore schools. Reliability coefficients, raw mean scores and sigmas were represented. Data are compared with those of Indonesian and American samples. It is concluded that at early ages, one culture stimulates different skills from another culture but that schooling tends to smooth out the differences. Intelligence tests, therefore, should be viewed as measures of the efficiency of the environmental background in stimulating the performance of special cognitive skills.

C.V. KILBURN, K.L. and SANDERSON, R.E. Predicting Success in a Vocational Rehabilitation Program with the Raven Coloured Progressive Matrices. Educ. Psychol. Meas. 1966. 26, 1031-1034.

The paper is concerned with assessing the degree to which the CPM and the Peabody (PPVT) predict patient success in a vocational rehabilitation program (VR) at a hospital for mentally retarded. With 21 patients, a difference was found on CPM between successes and failures, significant beyond the .01 level.

C. KILBURN, K.L., SANDERSON, R.E. and MELTON, K. Relations of the Raven Coloured Progressive Matrices to Two Measures of Verbal Ability in a Sample of Mildly Retarded Hospital Patients. Psych. Reports. 1966. 19 (3 part I) 731-734.

100 mildly mentally retarded patients were given the CPM, PPVT and the Vocabulary subtest from S-B. There were no significant correlations between the Raven and the other tests. Possible reasons for the lack of the usual correlation of the Matrices with tests of verbal ability for this sample are discussed.

A. KURODA, Jitsuo. Applications of the Coloured Progressive Matrices Test for the Japanese Kindergarten Children. Psychologia 1959. 2: 173-7.

CPM is a series in order of difficulty of 36 matrices or abstract designs, from each of which a part has been removed. Test data and correlation statistics are given. Test is said to be simple to adminster, suitable for cross cultural comparisons and for mental defectives, to be relatively independent of achievement and to motivate subjects. A study with 80 Japanese kindergarten children is reported, using book and board forms of the test. Results correlated with DAM and Zuzuki's Binet.

A. KURTH, E. Erhöhung der Leistungsnormen bei den Farbigen Progressiven Matrizen. (Increased Performance Norms on Coloured Progressive Matrices). Zeitschrift für Psychologie. 1970. 177 (1-2) 85-90.

454 East German pupils were tested with the non-verbal Coloured Progressive Matrices. Results were compared with those obtained by Raven in England in 1949, by Sperazzo and Wilkins in the United States in 1956 and by Green and Ewert in the United States in 1959. An international score increase was noted and hypotheses for this increase were suggested.

C. LANGE, Una A. Differential Performances of Minimally Grain-Damaged Boys and of Non-Brain Damaged Boys on Selected Tests. Doctoral thesis. University of Nebraska. 1969.

Results of a battery of tests presented to groups of minimally brain-damaged non-brain-damaged boys showed that the Memory for Designs Test was the most useful single discriminator. The SPM was included in the battery. All combinations which included the MFD were significant at the .05 or .01 levels, with the exception of the complete battery of tests and the combination of Symbol Digit Modalities Test, Benton VRT, CPM, Wide Range Achievement Test and the MFD.

C. LEVINSON, Boris M. A Comparison of the Coloured Progressive Matrices (CPM) with the Wechsler Adult Intelligence Scale (W.A.I.S.) In a Normal Aged White Male Population. J. Clin. Psych. 1959. 15. 288-291.

The CPM and the WAIS were administered to 89 white men aged 60-84 (average CA 68.71) attending private and public golden age clubs. The means and S.D.'s of the WAIS, Full, Verbal and Performance I.Q.'s were: 100.18, S.D. 15.82; 103.67, S.D. 16.31; 96.76, S.D. 16.20 respectively, and the mean of the CPM was 24.83, S.D. 5.59. The correlations of CPM with age, Full Scale, Verbal scale and the performance scale were: .37, .56, .49 and .55. Percentile norms were set up for the aged population. An analysis of the intercorrelations of the sets as well as of distribution of test scores indicated the feasibility of the administration of an abbreviated scale, consisting of Sets A-B, and of discontinuing the test after five consecutive failures on Set B.

E. LEVINSON, Boris M. A Comparison of the Performance of Bilingual and Monolingual Native Born Jewish Preschool Children of Traditional Parentage on Four Intelligence Tests. J. Clin. Psychol. 1959. 15: 74-6.

The Revised Stanford-Binet, Form L, the Wechsler Intelligence Scale for Children, Goodenough Draw-a-man Test and the Progressive Coloured Matrices were

administered to 57 native born monolingual and to 60 native born bilingual preschool Jewish children of traditional parentage. Both groups had good command of English and the test results were considered valid by the examiners. There was no correlation between socioeconomic background and intelligence for both groups. The Goodenough Draw-a-Man Test; Information, Comprehension and Similarities of the W.I.S.C. Verbal Scale, Picture Completion Block design, Object Assembly and Coding of the W.I.S.C. Performance Scale were found to give fair estimates of the ability of the native born bilingual Jewish children. On the measures listed, the two groups performed similarly. The socioeconomic level of the fathers was similar in both groups.

LEVINSON, B. A Comparative Study of the Verbal and Performance Ability of Monolingual and Bilingual Native Born Jewish Preschool Children of Traditional Parentage. J. Genetic Psychol. 1960. 97. 93: 112.

Revised Stanford-Binet, WISC, CPM and Goodenough Draw-a-man Test were administered to 58 boys and 59 girls aged 5 to 6 years with traditional Jewish parents. Means and S.D.'s given for all tests for sample as a whole and for categories of monolingual, bilingual, male and female. CPM not used in comparing verbal vs. performance ability as adequate norms not available for this sample.

LEVINSON, Boris M. Positional and Figural Errors made by the Aged on Raven Coloured Progressive Matrices. J. Genet. Psychol. 1962. 100: 183-92.

Study made to determine if there were any significant differences in positional choices and figural errors made on CPM by those aged 60-69 (N=83) compared to those 70-84 years (N=64). There was no significant change in rank order preference. Their positional choice differed from those of children. Medial position was preferred (40.75%) followed by left lateral (32.65%) and right lateral (26.60%). No significant decrease in sensible errors with age although there was a statistically insignificant decrease in "repetitive" errors made by 70-84 group.

C. LEVITA, E. and RIKLAN, M. Cognitive and Perceptual Functions and Lesion Location in Basal Ganglia Surgery. J. Clin. Psychol. 1965. 21 (4) 367-369.

The cognitive and perceptual performance of 22 Parkinsonians was assessed as a function of unilateral cryosurgical lesion placement in relation to the ventrolateral area of the thalamus. Overt verbal and visual/spatial functions are not differentially affected by anteroposterior, medial-lateral and depth aspects of surgical lesion location with one exception (Decrements on the Minnesota Form Board were found between preoperative and follow up scores on twelve items of CPM.

C. LÜER, Gerd. Zur Frage objektiver Trennung verschiedener Schwachsinnsformen bei Kindern mit psychologischen Tests. (The question of the objective separation of various forms of mental retardation in children with psychological tests). in F. Merz. (Ed) Bericht über den 25 Kongress der deutschen Gesellschaft für Psychologie. Munster 1966 (pp. 469-474).

> To ascertain whether distinctions (Classifications) could be made between retardates, 347 retardates were given a battery of 12 psychological tests. Ss were divided into groups on the basis of IQ, age and sex. 3 tests concerned overall intelligence: the Coloured Progressive Matrices, the Columbia Mental Maturity Scale, and the Peabody Picture Vocabulary Test. The other 9 tests included tests of verbal learning, motor development etc. Results, after validity was ascertained, indicate that Ss whose aetiology was exogenous (neurological disturbances) did not perform as well as those Ss having a familial aetiology. It is concluded that psychological tests could be used for classification of retardates.

A. MAISTRIAUX, R. Les Sous-Evolution des Noirs d'Afrique. Revue de Psychologie des Peuples. 1955. 10, 4. 80-90.

> Describes a number of tests developed to assess various aptitudes among Africans. The extent to which each correlates with CPM is reported.

E. MACARTHUR, R.S. The Coloured Progressive Matrices as a Measure of General Intellectual Ability for Edmonton Grade III Boys. Alberta J. Ed. Res. 1960. 6: 67-75.

> For a stratified sample of 300 Edmonton Grade III boys, intercorrelations of 12 ability and achievement measures were factor analysed by centroid method with orthogonal rotation, yielding four factors identified as 'g', schooling verbal and number. Coloured PM had high loading on first factor and had no loadings on the other factors. It was concluded that this test can be employed as an economical indicator of general intellectual ability for boys of this age, for whom group or individual "intelligence" tests may be considered unduly educationally or culturally biased.

A. MACCOBY, M. and MODIANO, Nancy. A Study of Children's Intelligence in a Mexican Village. Paper presented at Annual Convention of American Psychological Association, St. Louis. 1962.

> Coloured Progressive Matrices were administered to a random sample of 51 children, ages 6 to 11, drawn from the census lists of a Mexican village. They scored significantly better on CPM than on either the Stanford-Binet or the Draw-a-Man. It was the one intelligence

test of those administered which correlated with school achievement (r=.515, p=.01). It can be said that it is the intelligence test which best reflects the village child's ability to perform within his culture, even at tasks which call for verbal and abstract abilities.

E. McNAMARA, J.R., PORTERFIELD, C.L. and MILLER L.E. The Relationship of the Weschler Preschool and Primary Scale of Intelligence with the Coloured Progressive Matrices (1956) and the Bender-Gestalt Test. J. Clin. Psychol. 1969. 25 (1) 65-68.

The relationships between WPPSI (Weschler Preschool and Primary Scale of Intelligence) full scale, verbal and performance I.Q.'s and eleven WPPSI subtests with Progressive Matrices and Bender-Gestalt Test were explored. 42 culturally disadvantaged, preschool Negro children were administered the tests in counterbalanced order. Pearson product moment correlations were obtained between Matrices scores and WPPSI subtest, scale scores and I.Q. scores. Obtained correlations indicated Bender-Gestalt is highly related to performance areas on WPPSI and may be more appropriately interchanged than P.M. for obtaining estimates of WPPSI full scale I.Q.'s. Full Scale WPPSI I.Q. is not significantly affected by order of administration of WPPSI within the battery.

C. MALPASS, Leslie F., BROWN, Ronald, HAKE, Donald. The Utility of the Progressive Matrices (1956 edition) with Normal and Retarded Children. J. Clin. Psychol. 1960. 16: 350.

104 retarded children, 56 institutionalised and 48 enrolled in "educable mentally handicapped classes" were given W.I.S.C. and 67 normals enrolled in same schools were given California Test of Mental Maturity. Matrices were administered individually under standard conditions to all subjects. r's obtained in comparing these I.Q.'s were P.M. & W.I.S.C. for all retarded subjects r = .506; for institutional retardates r = .508; and for non-institutionalised retardates r = .511. For C.T.M.M. and PM, r for all normals was .541. These r's were lower than those reported between 1938 P.M. and C.T.M.M. and considerably lower than those reported by Raven between 1956 P.M. and Stanford-Binet test. Results suggest 1956 revision of P.M. differentiates retarded and normal children quite well and that these matrices demonstrate differences between institutionalised and non-institutionalised retarded children at the same level as I.Q. scores do.

MARTIN, A.W. and WIECHERS, J.E. Raven's Coloured Progressive Matrices and the Wechsler Intelligence Scale for Children. J. Consult. Psychol. 1954. 18, No. 2. 143-144.

Comparing the results of the Matrices, 1947, Sets A, Ab, B with the W.I.S.C. Performances of 100 Indiana Children (aged 9-10) high correlations were obtained between the Matrices and the W.I.S.C. full scale, verbal and performance I.Q.'s.

MEYERS, E., ORPET, R.E., ATTWELL, A.A. and DINGMAN, H.F. Primary Abilities at Mental Age Six. Monographs of the Society for Research in Child Development, Vol. 27, No. 2. Serial No. 82 Lafayette, Ind.: Child Development Publications, 1962.

A battery of 13 tests hypothesizing 4 ability factors (hand-eye psychomotor, perceptual speed, linguistics and spatial reasoning, including PMO was administered to 2 groups, 100 schoolchildren of CA 6 years and 100 institutionalised retarded subjects with average MA of 6. Intercorrelation matrices yielded oblique factors as follows - 6 for school group included the 4 hypothesized factors, a probably immediate memory factor and a tentative diurgent or expressive language factor. 5 factors for retarded group - same as above, but without evidence of a diurgent factor. Inter-correlations of factors given second-order analysis with remitting suggestion of a second order general factor in retarded, but not in school group. In general, school group demonstrated more clearly differentialled mental development. Results suggest at developmental stages in question, differentiation of abilities is already well advanced.

A. MODIANO, Nancy. Mental Testing Among Tzeltal and Tzotzil Children. Presented at XXXV International Congress of Americanists, Mexico City, 1962.

The Machover's Draw-a-Man Test, Bender-Gestalt, Goodenough's Draw-a-Man and the CPM were given to groups of Tzeltal and Tzotzil children in S. Mexico. Difficulties arose over administration because of cultural expectations. A Board Form was used in some instances. The test may have some value as a gauge of intelligence in cultures other than our own.

A. MONROE, J.J. Un Test de vocabulaire pour le tri des francois candidats a l'immigration aux etats-unis. (A test of vocabulary for sorting French applicants to the United States). Rev. Psychol. Appl. 1965 15 (4) 239-252.
The results of 508 French candidates for migration chosen at random to explore the possibility of using the Vocabulary Test of Binois and Pichot to exclude cases of mental retardation, as well as those candidates suspected of intellectual deficit on the basis of their results on the Coloured Progressive Matrices (Text in French).

A. MONROE, J.J. Niveaux d'aptitude mentale de groupes nationaux estimes sur des echantillons au hasard et stratifiés de candidats immigrants. (Mental Capacity Levels of National Origin Groups estimated from random and stratified sampling of Immigration Applicants). Rev. Psych. App. 1965. 15 (4) 219-238.
The levels of intellectual capacity of 1,498 subjects were chosen at random from candidates for migration from three national groups, and scores on the Coloured Progressive Matrices were statistically analysed. Significant effects in the three groups for cultural level, age, sex and married status. The level of achievement for Italians was uniformly less than that for French or Germans (Text in French).

E. MUELLER, M.W. A Comparison of the Empirical Validity of Six Tests of Ability with Educable Mental Retardates. Doctoral thesis. George Peabody College for Teachers. 1965.
This investigation was designed to evaluate the empirical validity of six general ability tests, designated predictors, against a number of measures of learning. These were the S-B, ITPA, PPVT, PTI, CPM and PMAT. Validity coefficients of the predictor tests against the overall criterion score included CPM .50. Comparison of the coefficients indicated that the PMAT, S-B, PTI and ITPA were significantly more valid than the CPM and PPVT.

C. MUELLER, M.W. Validity of Six Tests of Ability of Educable Mental Retardates. J. School. Psychol. 1968. 6 (2) 136-146.
Evaluated validity of six tests of ability for prediction of learning ability of primary age educable mental retardates. From a total of 142 subjects, 38 girls and 63 boys, (CA = 9 years) were

studied. Evaluation techniques included correlation of ability tests with achievement and learning task criteria, inter-correlations of ability, tests and multiple regressior analysis. Results indicate that primary mental abilities test, Stanford-Binet, Pictorial Test of Intelligence (French) and Illinois Test of Psycholinguistic Abilities are equally valid and superior to Coloured Progressive Matrices and PPVT.

NICHOLS, John E. Jnr. Structural Efficiency of the Raven Coloured Matrices. J. Clin. Psychol. 1967. 23 (4) 489.
Study evaluated a short form of Raven Coloured Matrices (CM) as a test of "observation and clear thinking". Brief CM test uses only 12 items. Results were evaluated on 43 child outpatients and compared with WISC results. 20 child outpatients also received a brief WISC, Ammons Full Range Picture Vocabulary, Grace Arthur's Stencil Designs and four tasks in Productive thinking. M.A.'s on full C.M. .79 with M.A.'s on brief CM. Structural efficiency of C.M. test was questioned as Brief C.M. and Full C.M. test produced similar test results. Suggested that brief C.M. could be used with brief WISC to reduce chances of misidentifying children with verbal or language handicaps as being mentally retarded.

C. NICHOLSON, Charles L. Correlations Among C.M.M.S., P.P.V.T. and R.C.P.M. for Cerebral Palsied Children. Percept. Mot. Skills. 1970. 30 (3) 715-718.
Correlations among the PPVT, CMMS and CPM were based on the performance of 38 cerebral palsied children whose mean age was 149.5 months. The coefficients were all positive and significant (p .05). Considerable scatter in I.Q.'s was found among all sets of data. The mean I.Q. on the PPVT was approximately 20 points higher than the mean I.Q.'s obtained from the CMMS and CPM, which were approximately equal. Comparison of scores for noncerebral palsied children on these tests showed all three gave similar mean I.Q.'s. However, correlations among tests for noncerebral palsied children differed from those for cerebral palsied children.

A. NORMAN, Ralph D., and MIDKIFF, Katherine L. Navaho Children on Raven Progressive Matrices and Goodenough Draw-a-Man Tests. Southw, J. Anthrop. 1955. 11:129-36.
The I.Q. level for 96 Indian children with various degrees of white schooling was lower on Progressive Matrices than on Goodenough. Correlation between the tests is low and sex differences on both are neglible. Poor performance on the Raven is consistent with findings on other native populations.

E. O'BRIEN, K.G. and MACARTHUR, R.S. Reversibility, Intelligence and Creativity in Nine-Year-Old Boys. Child Development, 1969. 40, 1. 33-45.
The relation of Piagetian reversibility to intelligence and to creativity was investigated in 85 nine-year-old Edmonton boys. Data were collected on Piagetian, Torrance, intelligence, age and occupation variables. Factor analyses reduced the Piagetian and Torrance batteries to derived measures of reversibility and creativity, respectively. These were than combined with the other variables for statistical and further factor analysis.

A. OMBREDANE, A. ET ROBAYE, F. Le Probleme de l'épuration des resultats des tests di'intelligence étudié sur le Matrix-couleur. Comparaison des techniques de reduplication et d'explicitation. Bulletin du Centre d'etudes et Recherches Psychotechniques. 1953. 4. 3-17.
Discusses the problems experienced by primitive groups in grasping what is required even on apparently culture free test (CPM) Compares the effect of repeat testing with and without explanation for groups of children from the Congo and from Brussels.

A. OMBREDANE, A., ROBAYE, F. and PLUMAIL, H. Resultats d'une application repetee du matrix-couleur à une population de Noirs Congolais. Bulletin du Centre d'Etudes et Researches Psychotechniques. 1956. 6. 129-147.
Having described the conditions under which over a period of two years the authors studied a very under-developed black population of Congo, they present a first series of results relating to application of Raven's CPM. Two groups (1) in bush (2) in a mining centre, 1000 examined and 693 results analysed. Found results of CPM considered as a test of the g factor do not only depend on age but also on degree of scholarship. Curve of means a significant degree of differences between these means are given. A provisional standardisation is given for working population at the mining centre.

C. ORME, J.E. The Coloured Progressive Matrices as a Measure of Intellectual Subnormality. Brit. J. Med. Psychol. 1961. 34:291-2.

Coloured Progressive Matrices scores and W.A.I.S. full scale I.Q.'s were obtained from 203 mentally subnormal subjects, aged 16-65, within 40-80 I.Q. range. Correlation between the two measures indicates the Coloured Matrices is an efficient measure of intellectual subnormality. It has also advantages of being (a) a quickly administered test relatively uninfluenced by attainments or manipulative ability (b) a test of homogenous composition as such, it would appear to have potentialities in work with the mentally subnormal.

E. RADFORD, J. Verbalisation Effects in a Nonverbal Intelligence Test. Brit. J. Educ. psychol. 1966. 36 (1) 33-38.

Two experiments were carried out with a total of 90 children aged between 9 and 12 to investigate the effects of verbalising on problem solving. The problems were those of the Progressive Matrices intelligence tests. It was found that performance improved when subjects were asked to give reasons for their choices and these reasons were verbally reinforced. Reinforcement is thought to have had the effect of decreasing sterotyped responses.

A. RATTAN, M.S. and MacARTHUR, R.S. Longitudinal Prediction of School Achievement for Metis and Eskimo Pupils. Alberta J. of Educ. Res. 1968. 14. 1. 37-41.

The current study provides evidence that these three culture reduced tests also have substantial long-term predictive validity for the Metis and Eskimo samples studied. Further, the CPM and SCRIT for the Metis sample, did not differ significantly from the more conventional California Test of Mental Maturity Language and CTTM Total in predicting California Achievement Total Scores over a four year period.

C. RICH, Charles Clifton. The Validity of an Adaptation of Raven's Progressive Matrices Test for Use with Blind Children. Doctor's thesis, Texas Technological College (Lubrock, Texas). 1963.

Purpose was to determine validity of Coloured P.M. adapted for blind children (Designs perceived by touch), Validity criteria were WISC Verbal Scale I.Q.s, academic grade average, teachers' ratings, grade placement and C.A. P.M. and WISC Verbal Scale given to 115 blind children of both sexes aged 6-15

years. Moderately high correlations between tactual P.M. & C.A. and grade placement were obtained. Correlation of tactual P.M. with WISC Verbal Scale was positive and significant but not as expected if test was highly valid. High relationship found between measures of academic achievement and P.M. scores of children 12 years and older but lower for younger ages. Item analysis showed some items were unsatisfactory.

C. RICH, Charles C. and ANDERSON, Robert P. A Tactual Form of the Progressive Matrices for use with Blind Children. Personnel and Guidance Journal 1965. 43 (9) 912-919.

CPM were adapted to a tactual format, thus making possible the insightful solution of test items without use of vision. In order to determine the validity of this test as a measure of intelligence in blind children, tactual P.M. scores of 115 blind students were correlated with WISC verbal scale I.Q. scores, academic achievement and chronological age. Subjects ranged from 6-15 years and all had 99% or greater loss of visual efficiency. The tactual test correlated with validity criteria in a positive and significant manner. Kuder Richardson reliability of tactual PM was found to be adequate in children age 9 years and older. It was concluded that this test shows promise as a nonverbal intelligence test for the child 9-15 years of age, but that further development is necessary before it can be considered a useful supplement to the standard tests used with the blind.

C. RICHARDSON, Elizabeth J. and KOBLER, Frank J. Testing the Cerebral Palsied. Except. Child. 1954 21:101-3, 108-9.

32 cerebral palsied children (22 boys, 10 girls ranging in C.A. from 61 to 138 months) were tested by means of Stanford-Binet, coloured form of Raven Progressive Matrices and two forms of Ammons Full Range Picture Vocabulary test. Product moment correlations between results on Binet and on other three ranged from .74 - .90; between Raven and two forms of Ammons .63 - .64 and between two forms of Ammons .94. Possible merits of using either Raven or Ammons alone or in combination are duscussed.

ROBAYE, F., ROBAYE, E. et OMBREDANE, A. Determination de la zone discriminative dans un test a item de difficulte croissante. Bulletin du Centre d'Etudes et Recherches Psychotechniques 1956. 6. 149-159.

The authors studied more than 400 protocols of colour matrix of 3 populations of different level from the point of view of the discriminative age value of the items. The use of the statistics of information R allowed the item test correlation to be established without the necessity of making hypothesis on the normality of the compared variables. The use of a graph facilitates its determination. The examination of the values of R for each item of a test makes possible both a study of the level of a population and also a criticism of the structure of the test to be made. A discriminative zone of the population was established.

A.E. ROHWER, W.D., AMMON, M.S., SUZUKI, N. and LEVIN J.R. Population differences and learning proficiency. J. Educ. Psychology. 1971. 62, 1, 1-14.

The study examined the hypothesis that school-achievement deficiencies of low SES black children are attributable to corresponding deficiencies in learning ability. 288 low-SES black and high SES white children from three Grade levels (Kindergarten, 1st and 3rd) were sampled. The PPVT, CPM and 4 paired-associate measures were administered. Results reveal large population differences on the PPVT and the CPM at all grade levels, the largest difference being between the 3rd grade samples. In contrast the paired associate measures reveal a population difference only at the kindergarten level.

SALVIA, J. and YSSELDYKE, J. An analysis of the reliability and validity of the Ishihara color plates with mentally retarded males. Percept. Mot. Skills, 1971, 33, 243-246.

The reliability and validity of the Ishihara were tested using 69 institutionalised mentally retarded boys. CPM was also administered; no significant correlation was found between the Ishihara and CPM.

C.E. SEIFERT, K.H. Erfahrungen mit dem Progressive Matrices Test bei taubstümmen Kindern. Zeitschrift fur Experimentelle und angewandte Psychologie, 1960. 7. 255-290.

Teacher ratings and P.M. of 101 deaf children (aged 8-18) were correlated (r=.5). The test differentiated more sharply than the teacher ratings. The results are discussed in terms of differential and development psychology. (Text in German)

C.E. SEIFERT, K.H. Der Progressive Matrices Test und seine Anwendung bei taubstummen Kindern. Neue Blätter für Taubstummenbildung. 1960. 4. 16-22.

Gives an outline in German of how CPM may be administered to deaf and dumb children, using either the book or a board form. Reports favourably on its use with 150 children aged 8-16, but no data are presented.

A. SEMLER, Ira J. and ISCOE, Ira. Structure of Intelligence in Negro and White Children. J. Educl Psychol. 1966. 57 (6) 326-336.

Performance levels on the WISC and on CPM and the factorial structures of the WISC were compared for white and negro children. White S's had higher WISC FS I.Q.'s than Negroes at all levels and higher P.M. scores at the 7 year level but not at the 8 and 9 year levels. The P.M. intercorrelation matrices for white and negroes were highly similar.

C. SILVERSTEIN, A.B. Psychological Testing Practices in State Institutions for the Mentally Retarded. Amer. J. Ment. Def. 1963. 68. 440-445.

Survey of State institutions for the mentally retarded on psychological testing practices. P.M. was one of the tests used and frequency of usage is given.

A. SPERRAZZO, Gerald and WILKINS, Walter L. Racial Differences on Progressive Matrices. J. Consult. Psychol. 1959. 23: 273-4.

Additional analyses as suggested by Jensen have been carried out, i.e. 3 analyses of variance of socioeconomic status of 480 children. Findings show a significant difference between the races (negro and white) in 2 of the 3 socioeconomic status interactions reported earlier (based on father's occupation in professional, skilled or clerical, unskilled, labour). Surprising that a relatively nonverbal performance test is demonstrably sensitive to differences in socioeconomic levels.

C. STACEY, Chalmers L. and CARLETON, Frederick O. The Relationship Between Raven's Coloured Progressive Matrices and Two Tests of General Intelligence. J. Clin. Psychol. 1955. 11: 84-5.

Coloured P.M., Revised Stanford Binet (form L) and WISC were administered to 150 children between 7 years 5 months and 15 years 9 months. All were referrals to Syracuse State School for possible mental deficiency but not all were retained in institution. Pearson product moment correlations were obtained between Matrices scores and Stanford Binet M.A.'s and I.Q.'s, WISC I.Q.'s and weighted scores and subtest weighted scores. Correlations

between Matrices scores and Stanford Binet M.A.'s and I.Q.'s were similar but higher than correlations between Matrices scores and WISC I.Q's and weighted scores. Highest correlation between Matrices scores and WISC I.Q.'s and weighted scores was for full weighted scores. Correlations between Matrices and WISC weighted subtests ranged from .48 (picture completion) to .28 (coding).

C. STACEY, Chalmers L. and GILL, Marie R. The Relationship Between Raven's Coloured Progressive Matrices and Two Tests of General Intelligence for 172 Subnormal Adult Subjects. J. Clin. Psychol. 1955. 11: 86-7.

Coloured P.M., Rev. Stanford Binet (form L) and Wechsler Bellevue were administered to 172 subnormal adults between 16 and 57-1/2 years; all under jurisdiction of Syracuse State school. Pearson product moment correlations obtained between Matrices scores and Stanford Binet I.Q.'s, W-B I.Q.'s and weighted scores and subtest weighted scores. Among correlations between Matrices scores and W-B I.Q.'s and weighted scores, highest found was for full scale I.Q.'s. Correlations between Matrices and W-B weighted subtest scores ranged from .60 (Block Design) to .29 (arithmetic).

N. SPERRAZZO, Gerald and WILKINS, Walter L. Further Normative Data on the Progressive Matrices. J. Consult. Psychol. 1958. 22, 35-37.

The Coloured Progressive Matrices Test was administered to 480 St. Louis school children, ranging in age from 7-11 years. The subjects were selected from 3 St. Louis public schools. One was an all-Negro school, another an all-white school and the third enrolled both white and negro children. Three levels of socioeconomic status, based upon the occupation of the father, were established for purposes of comparison. The first category included professional and semi-professional workers, the 2nd skilled, semi-skilled and clerical workers and the third, labourers, unskilled and service workers. Significant differences were found between age levels, between races and between socioeconomic levels.

E. TUDDENHAM, Read D., DAVIS, Louis, DAVIDSON, Leslie and SCHINDLER, Richard. An Experimental Group Verson for School Children of the Progressive Matrices. Abstract. J. Consult. Psychol. 1958. 22: 30.

Experimental group test version of Raven's P.M. was prepared by "ditto" reproduction process to explore suitability of test for American grade school children. (Test used booklets instead of answer sheets and colour as in 1947 edition was eliminated). Two classrooms representing different socioeconomic

levels were tested at each level from 3rd-6th. Mean scores showed expected progression from grade to grade. Reliability coefficients for separate grade levels range from .87 to .94. Tentative %ile norms for each grade are presented and are close to Raven's norms. Differences between upper middle class and working class schools are substantial and highly significant. Correlations between P.M. and Kuhlman-Anderson, Californian Mental Maturity and Lorge-Thorndike tests are similar - about .40 or .45.

A. TURNER, G.H. and PENFOLD, D.J. The Scholastic Aptitude of Indian Children of the Caradoc Reserve. Can. J. Psychol. 1952. 6: 31-44.

By total group and by age groups, the Indian children have a significantly lower scholastic aptitude than a comparable group of white children. The abilities of the Indians and Whites cover much the same range and superior Indian children are above the average whites. Importance of environmental differences is pointed to.

E. TYSZKOWA, Maria. Poziom inteligencji a powodzenie dziecka w pracy szkolnej. (Level of Intelligence and Children's Success in School). Filozofia, Psychologia, Pedagogika. 1963. 6. 39-74.

A series of correlations between select intelligence tests (Binet-Terman, Raven's Progressive Matrices, Kohs Block test) and various indicators of school success ranged from .69 - .96. The tests were useful in differentiating between bright children and those who repeated the initial grades of school.

E. VAN DER LINDEN, F.J. Intelligentie en School prestaties van jonge Schoolkinderen. (Intelligence and School achievement in Young School Children.) Nederlands Tijdschrift voor de Psychologie. 1970. 25. 5. 278-301.

The scores on three intelligence tests were analysed. (P.M.A. 5-7; Stanford Binet, C.P.M.) Also three reading and three arithmetic tests. After rotation, six factors could be interpreted: school achievement, verbal reasoning, space, number, practical thinking and elementary comprehension. Separate verbal and memory components were not found. More than half the variance could not be declared, supposedly due to low reliability of the test material. (Paper in Dutch.)

VERNON, P.E. Educational and Intellectual Development among Canadian Indians and Eskimos: Part II. Educ. Rev. (Birmingham) 1966. 18, 79-91 and 186-195.

A wide variety of tests was given to indigenous groups of Indians and Eskimos. A variation of scores when compared with English standards was found even on those supposedly 'culture-fair'. It is impossible to infer that these aboriginal groups differ in genetic general intelligence...yet it would be equally unjustifiable to claim that these groups have the same educational and vocational potential as whites...Our second major finding is the rise in scores on most inductive reasoning and perceptuo-spatial tests, associated with a more resourceful and independent mode of existence, and stronger masculine identification in the upbringing of boys.

C. WAMBA, D.E. and MARZOLF, S.S. Use of Eye Movements as a Response Indicator in Testing the Physically Handicapped. J. Clin. Psychol. 1955. 11: 405-7.

Apparatus was devised for administering tests to handicapped people by using eye fixation as means of indicating choice of response. P.M. used to test this 46 children from 6-11 years without physically handicap were randomly assigned to experimental group A or B. Group A given P.M. in booklet form and a week later the adaptation. Order was reversed for Group B. Mean scores of two forms was identical but S.D. for booklet form 3.32 while S.D. for adaptation was 2.62, (difference not significant at 5% level). Correlation between two forms for Group A is .86 and for group B .85. Difference due to order of presentation is significant at 1% level. Most important is lack of difference between two forms of the test.

E. WENKE, W. and MULLER U. Möglichkeiten und Grenzen des Einsatzes diagnostischer Kurzverfahren bei der Schulerauslese. (Possibilities and limitations of several short-cut methods of a diagnostic test in pupil selection.) Zeitschrift für Psychologie, 1966, 172, 82.

Reliability and validity of Raven's Coloured Progressive Matrices as a diagnostic instrument were examined. Groups of 124 normal and 142 under-achievers served as subjects. Number, type and motivational value of the tasks were found adequate for respective age levels. Some of Raven's evaluation procedures were considered misleading and certain corrective

procedures were suggested. The test was found to differentiate well between the various performance levels, and its use as a diagnostic tool is suggested.

WETHERICK, N.E., FITZSIMMONS, E.K. and HILLS D.A. Inductive thinking in Subnormals. J. Ment. Subnorm. 1969, 15 (2) 79-84.

A test procedure from a previous study, which showed that in normal children inductive reasoning capacity develops in stages between the age of 5 and 10, was used to test inductive reasoning in socially subnormal adults and emotionally subnormal children. In 25 socially subnormal adults covering the same range of scores as normal children on CPM, performance resembled that of children much younger than their CPM scores would have suggested as an appropriate comparison. Only 2 showed any capacity to improve their performance with knowledge of results.

C. WILLIAMS, J. and WILCOCK J. An Alternative to Binet Mental Age Scores as a Criterion in Discrimination Learning. J. Ment. Def. Res. 1966. 10. 27-32.

This study arose in the course of discriminative learning experiments with matched normal and severely subnormal subjects. Practice of using CA as a criterion for the former subjects and a Binet Mental age score for the latter was questioned. Coloured PM was considered as an alternative criterion which could be used with both normal and severely subnormal subjects. Results showed that with a severely subnormal population, Progressive Matrices yielded positive and significant correlations with learning ability whereas Binet mental age scored yielded insignificant correlations. Concluded that Coloured Progressive Matrices in a modified form would constitute a useful and more valid alternative to Binet in future experiments on discrimination learning.

A. WILSON, Lolita. A Comparison of the Raven Progressive Matrices (1947) and the Performance Scale of the Wechsler Intelligence Scale for Children for Assessing the Intelligence of Indian Children. Master's thesis. University of British Columbia. 1952.

A. WOBER, Mallory. Notes on Administering Psychological Tests in Africa. Bull. B.P.S. 1967. 20. 68. 25-34.

A brief description is given of the nature and administration of seven tests to a group of industrial employees in Southern Nigeria. Six of the tests (including CPM) used a visual medium of communication, while the last involved proprio-

ceptual information as well. Some difficulties met in doing the visual tests are described, compared to those involved in giving the proprioceptual test. The subjects may not appreciate the rationality of the whole testing situation and it is suggested that it is suggested that it is in this context that attempts to explain bizarre responses might be made.

A. WOBER, M. The Meaning and Stability of Raven's Matrices Test Among Africans. Intern. J. Psychol. 1969. 4. 229-235.

86 Nigerian adult male subjects took Raven's PM and an adapted Embedded Figures test and six months later took PM again. Retest scores showed a significant rise and a significantly higher correlation with the Embedded Figures Test than appeared at the first testing. Improved scores appeared particularly among lower initial scores. Discussion of related research suggests the importance of the social situation under which testing occurs, the communication method and the possibility that subjects learn to perceive, decode and process information more efficiently in one medium than in another. The complexity of the situation suggests that further research be designed to yield unequivocal results.

4. Advanced Progressive Matrices (APM) with or without MHV

C. ADAMS, Anne and FOULDS, G.A. Personality and the Paranoid and Depressive Psychoses. Brit. J. Psychiat. 1963. Vol. 109, 459, 273-278.

A study of two psychotic groups (paranoid and depressive) viewed in terms of personality and symptomatology. MHV and the introductory series of APM were used and correlated with criterion measures but no significant effects were observed.

A. BIESHEUVEL, S., JACOBS, G.F. and COWLEY, J.J. Maladjustments of Military Personnel. J. National Institute for Personnel Research, 1953. 5. 138-168.

A South African study in which 50 delinquent soldiers sentenced to detention barracks for a variety of offences, 50 soldiers considered maladjusted by their officers on account of their non-conformance to discipline, and a control group of 50 considered in every respect to be well-adjusted were given a variety of diagnostic tests. No relationship was found between intelligence (using APM) and crime or maladjustment to military codes of conduct.

V. CLARK, D.H., STONE, W.F. and FINNER, S.L. Manpower Utilisation in Maine; A Research Report. Manpower Research Bulletin No. 4, 1969.

A study of the utilisation of the work force in the State of Maine, taking into account age, migrant status and intellectual ability - this last being assessed by APM (Set I).

E. DAVIES, D.L. A Comparative Study of Some of the Intellectual, Socia and Emotional Characteristics of Bilingual and Monoglot Students at a Welsh University College. Master's thesis, University College, Cardiff, 1957.

138 students were given the Welsh Linguistic Background Scale to differentiate those who were monoglot English from those possessing Welsh and English language backgrounds. The 2 groups were then given a battery of psychological tests which included PM, set II, 16 PF, a Cultural Attitude test devised by the author and a comprehensive interest schedule. It was found that bilinguals still obtained lower scores, on the average, than did monoglots in the intelligence test (PM) which was perceptual in character and thus as free as possible from verbal bias.

FORBES, A.R. An Item Analysis of the Advanced Matrices. Brit. J. Educ. Psychol. 1964. 34, 3, 1-14.

Prior to revising Advanced Matrices (1947) an Item Analysis was carried out on a sample of cases drawn from a parent population of over 2,000. The method of analysis is described and the reasons for the retention and rejection of items given. The findings are discussed in the light of those of Yates (1961). It is concluded that the new edition, P.M. (1962) although shorter will be at least as efficient as the 1947 version.

FOULDS, G.A. and RAVEN, J.C. An Experimental Survey with Progressive Matrices (1947). Brit. J. Ed. Psychol. 1950. 20, 04-10.

From the results of survey, the scale appears to provide a consistent estimate of efficiency with which a person is able to apprehend characters presented for his perception, form comparisons between them and reason by analogy. Low retest reliability before the age of eleven years does not appear to be due to design of test alone, and opens a question of considerable psychological interest. Scale's retest reliability increases rapidly after age of 11 years. Used with adults scale appears to have a high retest reliability, while result obtained on test agree with independent estimates of intellectual ability. Test scores obtained by university students in 40 minutes show no evidence of ceiling effects either at the end of the scale or at any intermediary level.

A.V. GONZALES DEL PINO, ANDRES SANCHEZ nieto, AFRICA DOMINGUEZ DE L. NAVARRO Y CARLOS CASTANO LOPEZ-MESAS. Estudio diferencial de la inteligencia medida con el test de Matrices Progresivas (Raven, Edition 1962) en una Muestra de 7,524 Universitarios Espanoles. (Differential study of intelligence measured with the Progressive Matrices test (1962) on a sample of 7,524 university students.) Revista de Psicologia General y Aplicada. 1969. 24, 711-719.

Spanish university students were tested. The overall group average did not differ from that for English students. There were significant differences among vocational sub-groups of students tested, as well as regional differences. The results in general conformed to previous results of this test. (Text in Spanish.)

A.V. GONZALEZ DEL PINO, DE LA TORRE, ALEGRE, LOPEZ NAVARO y AFRICA DOMINGUEZ. Estudio diferencial de la Triada Neurotica y Escala Pd del MMPI en Universitarios Espanoles. (A differential study of the MMPI neurotic triad and Pd scales for Spanish university students.) Revista de Psicologia General y Aplicada, 1969, 24, 728-733.

A Spanish language version of the MMPI was given to a university sample of approximately 1200 students. Some significant differences were found between the MMPI scales and the university major chosen, as well as residence district in Spain. A low, negative correlation was found between intelligence as measured by Ravens Progressive Matrices and the MMPI scales. Students with college majors emphasising intelligence (technical and scientific) could be classified as maladjusted in contrast to the less intellectually demanding areas. (Text in Spanish.)

HUTTON, K. Intelligence Quotients and Differential Fertility. Unpublished Proc. Eugenics Society, 1952.

The author used the Matrices Test (1947) Sets I and II as one of a number in an investigation of 48 boys (aged 15-18) at Winchester College, in investigating the effects on intelligence of differential fertility.

ISCOE, I. Distributions of Matrices Scores of 71 Freshmen. Unpublished report, University of Texas, 1955.

(a) Distribution of Matrices scores of 71 college freshmen are given and the correlations of Matrices scores with ten other tests. (b) The Mean Matrices score of 54 college students are given and the correlation of the Matrices scores with the four subtests of the WAIS.

A. KEATS, Daphne M. A Cross-Cultural Study of the Development of Cognitive Structures in University Students with Special Reference to Asian Students in the University of Queensland. Unpub. PhD. thesis. Faculty of Education, University of Queensland, 1970.

The results of this study supported the hypothesis that Asian students could be considered as a unique group differing from Australian students in cultural background and adaptation to the Australian university environment. As part of this study a battery of tests was given, including PM (1947), a reading comprehension test and a vocational interest test. The study covered a three year period and the tests were given at the beginning and end of this period. Progressive Matrices was used as it was a "culture free" test and it was given

individually. On both the initial and final occasions, the Australian students performed significantly better than the Asians in all performance categories. Difference was significant at 0.01 level. Some practice effect was seen.
The test discriminated between the most successful and the least successful Asian students on the initial occasion but not between the most and least successful Australian students. Performance of other Asian groups was not significantly lower than that of the better Asian students. Further comparisons could not be made because of the smallness of the groups.

McDONALD, R.P. Difficulty Factors and Non-linear factor Analysis. Brit. J. Math. Stat. Psychol. 1965. 18, 11-23.

The performances of a group of children (C) and a group of adults (A) on 12 subtests formed from the Advanced Progressive Matrices have been separately factor analysed. In the Group C results, the second factor can be recognised as a difficulty factor, but the corresponding factor in Group A is not significantly related to the difficulty of the subtests.

V. PARRY, J.B. Use of Raven's Progressive Matrices Test (1947) in the Royal Air Force. Unpub. Report, 1955.

This version (PM 1947 Set II) is one of the measures used by the R.A.F. for officer and air crew selection, and scored with double timing - for 30 minutes (as a measure of speed), and for 40 minutes (as a measure of power). The 30 and 40 minute scores correlate 0.94. There is a suggested rearrangement of the items on the basis of difficulty. No validation material is yet available, but means, standard deviations and reliabilities are given for a 1950 and a 1955 sample.

SCHEPERS, J.M. A components analysis of a complex psychomotor learning task. Psychologia Africana 1962, 9, 294-329.

Test scores of 150 South African Air Force pupil pilots on Portable Hand-Foot Reaction tests were analysed. Pupils were also given tests of mental ability including APM. Elementary and principal components of the performance and error scores of the RT tests were analysed. A correlation of .45 was found between the factor scores in respect of the first factor and APM. This factor was found to be -
1. Linearly related to the group means of the various speed or quantity scores.
2. Positively associated with induction.
The vector corresponding to this factor has the typical shape of an average learning curve.

TAMHANKAR, V.S. A test report on Advanced Progressive Matrices, 1962. Dept. of Experimental Psychology, Univ. of Poona, 1967.

V. VENABLES, Ethel C. Placement Problems Among Engineering Apprentices in Part-time Technical College Courses: Part II - Level of Ability Needed for Success in National Certificate Courses. Brit. J. Ed. Psychol. 1961. 31: 56-8.

> Generally believed that high failure rates in part time technical college classes are due to lack of ability. Scores on two intelligence tests, including PM and two attainment tests obtained by 678 engineering students in four technical colleges gave a multiple r of 0.31 with success in first year examination or ordinary national certificate. In trade examinations, the figure was 0.61. Curve of least misfits gave "cut off" scores for both groups. Bottom 16% of those taking trade examination courses had failure rate of 72%. For UNC students, failure rate below "cut off" was 68%. Results show by use of two or three standardised tests on entry, colleges could place their students more effectively in three types of course available.

V. VENABLES, Ethel C. Placement Problems Among Engineering Apprentices in Part-time Technical College Courses: Part I - Range of Ability. Brit. J. Educ. Psychol. 1961, Vol. 31, 237-243.

> Engineering students in technical colleges were assessed with verbal (NIIP Group Test 33) and non-verbal (APM) tests. A difference between results on the two types of test was apparent with 77% of the students exceeding the 70th %ile for normals and 87% above the 50th %ile for normals.

E. VENABLES, Ethel C. Changes in Intelligence Test scores of Engineering Apprentices between the first and third years of Attendance at College. Brit. J. Ed. Psychol. 1961, 31: 257-64.

> Groups of part time day release engineering students in three local technical colleges were given verbal and non-verbal intelligence test early in first year and half way through third year. Statistically significance gains were made on verbal test at all levels of initial score. Students who had no failures in the previous two exams showed greater gains than those who failed at least once. Gains also varied according to initial differences in level between verbal and non-verbal scores. Results are compared with those obtained with university students using same verbal test and explanations in terms of intellectual growth, practice effects and "zeal in taking the examination" are discussed.

E. VOGGENTHALER, Anne Louise. A Comparison of the Progressive Matrices (1947) Set II, With Certain Group Tests Used with High School Students and School Grades. Master's thesis, University of Texas, (Austin, Texas). 1958.

E. WETHERICK, N.E. Structure and Content in Concept Attainment: A Full Scale Study. Brit. J. Psychol. 1969. 60, (3) 347-50.

Article reported effects of varying problem content on speed & accuracy of concept attainment. A previous finding that undergraduates did as well or better with unfamiliar content (Hebrew letters) as with familiar content (English letters) was not repeated. Subjects found the English letter form the easiest, followed by the Hebrew and the verbal forms. Intercorrelations between scores on the three forms of task are presented as evidence of the existence of a capacity for inductive reasoning which is closely related to intelligence as measured by Advanced PM.

YATES, Aubrey J. Item Analysis of Progressive Matrices (1947). Brit. J. Ed. Psychol. 1961. 31: 152-7.

Item analyses of Progressive Matrices (1947) were carried out separately for two groups of university students. The results indicated that the test successfully discriminated within relatively homogenous groups of high intelligence. It is suggested that the test could be improved by dropping some of the items and turning it into a power test, rather than one measuring a combination of speed and power.

YATES, A.J. The Relationship between Level and Speed on Two Intelligence Tests. Brit. J. Educ. Psychol. 1966. 36 (2) 166-170.

A group of first year engineering students was given PM (1947) with initial and final time limits: Nufferno Level Test with time limit; and an objective (mathematical) test with initial and final time limits. As in a previous study, Matrices test revealed a slow working group which was handicapped by the time limit. On the Level test, this group completed fewer items within the time limit but obtained as high a level score as the faster working students. The group was shown to be handicapped by the time limit on the objective test. Implications of these results for university selection procedures and relevance of the personality dimension of introversion/extraversion as a possible explanatory factor for the group differences are discussed.

E. YATES, A.J. Level, Speed and Personality Factors in the Intellectual Performance of Young Children. Brit. J. Educ. Psychol. 1966, 36 (3) 312-316.

Part of PM (1947) and an Arithmetic test were administered with initial and final time limits to a group of 100 nine year old pupils. It was shown that as in previous studies with university students, groups of subjects could be identified who were slow but accurate workers whose intellectual level was severely underestimated by imposed time limits. It was also shown that the same subjects tended to be handicapped by imposed time limits on both tests. No relationship between preferred work method and neuroticism or extraversion scores on the Junior M.P.I. was found.

YATES, A.J. A Note on Progressive Matrices (1962). Aust. J. Psychol. 1966. 18 (3) 281-283.

A standardisation study on Progressive Matrices (1962) utilising data from 960 new entrants to the University of Western Australia, revealed that the new shorter version of 1947 Advanced Progressive Matrices has not overcome the power/speed contamination problem demonstrated in the earlier version of the test.

YATES, A.J. Item difficulty level in Advanced Progressive Matrices (1962). To appear, 1972.

Advanced Progressive Matrices (1962) was administered to 554 university students as part of a laboratory class. Mean scores and percentage of Ss passing, failing and not attempting each item were calculated at 40- and 60-minute time limits, and in relatively "unlimited" time. The provision of "unlimited" time practically eliminates the "not attempted" category and enabled a determination to be made of the true difficulty of each item, unconfounded by differences in speed of working. It is suggested that the test should be reduced to 20 items and reconstructed in cyclic form.

5. Mill Hill Vocabulary (MHV) only

N. A.C.E.R. Australian Supplement to the Guide to using the Mill Hill Vocabulary Scale. Mimeographed, ACER, Victoria, 1965.

C. CHAPMAN, James and McGHIE, Andrew. A Comparative Study of Disordered Attention in Schizophrenia. J. Ment. Sci. 1962, 108, 455, 487-500.

> A previous clinical study suggested that a breakdown in the normal selective and inhibitory functions of attention is a primary disorder in schizophrenia. The present investigation attempts to examine experimentally the validity of this general proposition and of other specific hypotheses derived from it. A battery of tests designed to assess the effect of distracting stimuli upon attentive behaviour was applied to matched groups of 20 schizophrenic patients, 20 non-schizophrenic and 20 normal subjects. It proved possible to differentiate the schizophrenic group from the normal and patient control groups by their poor performance on a number of these tests, (Figure-Matching, Spot Tracer, Auditory-Visual Distraction, Auditory-Visual Integration, Auditory-Rotor). Although the scores produced on these tests significantly differentiate the schizophrenic group as a whole, there was a wider scatter in the individual performance of the schizophrenic patients. Some of the schizophrenic patients returned scores on the tests which were at least as high as that of the lowest scoring subjects in the non-schizophrenic patient group. Further analysis revealed that this overlapping of individual test scores was mainly due to the marked deficiency of the hebephrenic patients, all of whom performed at a significantly low level. The implications of these findings are discussed and future lines of investigation are considered.

CRAIK, F.I.M. and MASANI, P.A. Age Differences in the Temporal Integration of Language. Brit. J. Psychol. 1967. 58. 291-299.

> Two short experiments were carried out to examine age differences in short term memory for various types of material. Subgroups were divided on the basis of scores on MHV. Results confirmed that old subjects are at a greater disadvantage when dealing with highly meaningful material and also showed old subjects to be vulnerable to the effects of supra span interference.

CRAIK, F.I. and MASANI, P.A. Age and Intelligence Differences in Coding and Retrieval of Word Lists. Brit. J. Psychol. 1969. 60 (3) 315-319.

Word lists of several orders of approximation to English were presented for immediate free recall to young and old adult subjects. Total recall scores were broken down into "number of chunks recalled" and "number of words per chunk". "Chunks recalled" measure is taken here to reflect retrieval efficiency; scores were lower in older subjects but were unaffected by Mill Hill Vocabulary level. "Words per chunk" score is interpreted as measure of coding efficiency; age had no effect on this measure, but scores were poorer for subjects of lower vocabulary level. Conclusion drawn from a previous study that there is an age decrement in coding efficiency, was thus not supported by the analysis. It was concluded rather that main effect of age is on retrieval, while coding is affected by verbal intelligence.

C. DAVIDSON, P.O., PAYNE, R.W. and SLOANE, R.B. Introversion, Neuroticism and Conditioning. J. Abnorm. & Social Psychol. 1964, 68, 2. 136-143.

A study with students from whom were obtained measures of introversion, neuroticism and conditioning. Mean MHV scores were also obtained. None of the conditioning indices were significantly correlated with introversion, neuroticism or manifest anxiety as assessed by various questionnaires or with an independent psychiatric rating of anxiety based on an interview.

DUNSDON, M.I. and FRASER-ROBERTS, J.A. The Relation of the Terman-Merrill Vocabulary Test to Mental Age in a Sample of English Children. Brit. J. Stat. Psychol. 1953. 6, (2), 61-70.

Intelligence tests intended to cover the whole range of school age must be applied individually. For the comparison of large groups, vocabulary tests have manifest advantages in respect of reliability, validity, relative absence of practice effect, and, above all, in the amount of information obtained per unit of testing time. Accordingly, four vocabularies are being given to school children at Bristol, selected by a method which, it is hoped, will give a good random sample. The present paper presents data from a sample of English children showing the relation of the Terman Merrill Vocabulary Test to the scale as a whole. The sample consists of results obtained by applying Form L to 450 children ranging in age from 7.0 to 14.11 years. These were selected from the results available so as to yield a

sample which a mean I.Q. of 103 and a standard deviation of 17. To them were added data for 52 children aged 5.0 - 6.11 years, who were slightly lower in I.Q. and slightly less variable. The overall partial correlation between number of words and M.A. at fixed C.A. is .842, which is in close agreement with the results of other workers. Thus 70% of the information is obtained in 10% of the testing time. The regressions of words on M.A. and of M.A. on words are non-linear. The form of the curves is reflected in lower correlations between number of words and M.A. in the 7th, 8th and 9th years of life, these being respectively .71, .60 and .72. The other age group correlations range from .82 - .90.

DUNSDON, M.I. and FRASER-ROBERTS, J.A. A Study of the Performance of 2,000 children on Four Vocabulary Tests: I Growth Curves and Sex Differences. Brit. J. Stat. Psychol. 1955. 8, (1) 3-15.

(1) A 3% sample of the school children of the City and County of Bristol was selected by visiting all schools (including a number outside the city) and choosing those children, between the ages of 5.0 to 14.11 years, whose homes were within the city and whose birthdays fell on the first day of any calendar month. Four vocabulary scales were used: that from the Terman Merrill scale, Form L; Mill Hill Vocabularies A & B; and that from the Wechsler Intelligence Scale for Children. (2) The present paper gives the first results. The establishment of norms will be dealt with later. (3) All four vocabularies proved to be sex-biased in favour of boys, who on the average defined more words at every age studied. The differences were fairly substantial, and all were highly significant. (4) In 5 out of 8 comparisons given by 2 sexes and 4 vocabularies, the increment of score with C.A. showed no significant departure from linearity. Three showed some divergence. There was no significant departure from linearity in the combined score for all vocabularies. (5) The intercorrelations of the four scores, reduced to fixed age, were of the order of rather more than .8, they showed little variation in magnitude. (6) It is shown that omission of children attending private and independent schools would have distorted the results very seriously: on the other hand, absentees on the dates of the original visits to the school were not greatly lower in performance than the remainder, and their omission, in this particular sample, would not have altered the results very appreciably. It is not suggested, however, that this would be in general a safe procedure.

DUNSDON, M.I. and FRASER-ROBERTS, J.A. A Study of the Performance of 2,000 Children on Four Vocabulary Tests: II Norms, with Some Observations on the Relative Variability of Boys and Girls. Brit. J. Stat. Psychol. 1957. 10 (1), 1-16.

This paper gives norms for the vocabularies from the Terman Merrill and Wechsler Intelligence Scales, the oral definitions form of Mill Hill Vocabulary Scales A and B, and for all four vocabularies combined. In view of the sex difference, norms are given separately for boys and girls. Curves have been fitted for the increment of score with advancing age; and tables are given from which deviations from expectation can be read off. Further curves have been fitted for the increment of variance with advancing age. Deviations from expectation can be made comparable for children of different ages by multiplying by the ratio of the standard deviation, at observed age to a fixed standard deviation. Tables of multipliers are given for making this further adjustment, which also makes scores comparable for children of opposite sex. It is shown that for this sample the adjustment scores are, with small exceptions, independent of age at test, and that they equalise for children of opposite sex. The frequency distribution is substantially normal. In terms of the coefficient of variation, girls were more variable than boys in the younger age groups. At about 8 or 9 years equality is reached, and thereafter boys become progressively more variable than girls up to the age of 11 or 12. Beyond this age, the difference between the sexes is progressively reduced.

C. FOULDS, G.A. and OWEN, A. Speed and Accuracy on Mazes in Relation to Diagnosis and Personality. Brit. J. Soc. Clin. Psych. 1963, 3. 34-35.

Hypothesis was that schizophrenics should have a higher Wrong Direction score on the Porteus Mazes, regardless of personality, than should neurotics. Subjects were 24 neurotics and 20 schizophrenics matched for Vocabulary level on MHV. 2 other tests were also given and correlations between the tests are presented. Results showed a significant tendency for those who score towards the schizophrenic end of the Non-Integrated Psychotic Scale to have more Wrong Directions on the Mazes, regardless of personality type.

GIBSON, H.B. A Slang Vocabulary Test as an Indicator of Delinquent Association. Brit. J. Soc. Clin. Psycho. 1963. 2, 50-55.

The rationale of the Slater Selective Vocabulary test was followed in devising a test which would indicate habitual delinquent association. Pilot work gave a list of slang words likely to be familiar to delinquent boys and a test instrument was composed of these words buffered with items from the Mill Hill Vocabulary Scale. This instrument gives separate measures of knowledge of delinquent slang and of general vocabulary level. The test was administered to groups of normal and delinquent boys and factor analysis of the results indicated that slang knowledge exists somewhat independently of general vocabulary knowledge. The delinquent group had a significantly greater slang knowledge relative to their vocabulary level than the normal boys. Proposals for further use of the technique are discussed.

C. HAWKS, D.V. and PAYNE, R.W. Overinclusive thought disorder and symptomatology. British Journal of Psychiatry. 1971, 118, 547, 663-670.

Groups of male schizophrenics were compared with normals on tests of thought disorder. One criterion of selection was that all were assessed for a minimum performance on the MHV.

C. KENDRICK, D.C. Assessment of Premorbid Intelligence of Elderly Patients with Diffuse Brain Pathology. Psych. Reports. 1964. 15 (1) 188.

60 elderly subjects, matched for age, education and SES were divided into 'organic' and depressed categories. All Ss were given the verbal WAIS and MHV 'Synonyms'. Scores obtained on the Mill Hill with 'organic' patients are significantly higher than for their respective WAIS verbal I.Q.'s but that there is no difference for the depressed groups.

C. PAYNE, R.W. The Long Term Prognostic Implications of Overinclusive Thinking in Mental Patients: A follow up Study using Objective Tests. Proceedings of the IV World Congress of Psychiatry, Madrid. 1966. 2657-2660.

114 admissions to a mental hospital were given a battery of tests of thought disorder immediately upon admission before any treatment had commenced. The MHV was also given.

C. PAYNE, R.W. Cognitive Defects in Schizophrenia: overinclusive thinking. In J. Hellmuth (Ed) Cognitive Studies, Vol. 2. Brunner/Mazel, New York, 1971.

A survey of tests of thought-disorder, including the extent to which reports show any association with measures of intelligence. No significant correlation was found between MHV and tests of thought disorder in any of the studies reported.

C. PAYNE, R.W. and FRIEDLANDER, D. A Short Battery of Simple Tests for Measuring Overinclusive Thinking. J. Ment. Sci. 1962. 108, 454, 362-367.

The three best measures of overinclusion thinking in Payne and Hewlett's battery, those which had the highest saturations on the factor of over-inclusion, were the non-A score from the Object Classification Test, the average number of words used in explaining the Benjamin proverbs, and the average number of objects per group selected during the 'handing over' experiment in the Goldstein Object Sorting Test.

C. PAYNE, R.W., EVESON, M.B. and SLOANE, R.B. The Relationship between Blood Cholesterol Level and Objective Measures of Personality. J. Psychosom. Res. 1963, 7. 23-34.

A group of 48 male university student volunteers, whose fasting blood cholesterol levels were known, was investigated intensively.

PAYNE, R.W., NETLEY, C.T. and SLOANE, R.B. Rigidity, Drive and Conditioning in Neurotics. Brit. J. Psychol. 1967. 58 (1-2) 111-126.

Four of Brengelmann's questionnaire measures of rigidity, drive scale, the M.A. scale, the MPI and the Mill Hill Vocabulary Scale were given to 30 neurotic and 30 normal female subjects. In Experiment I, the eye blink response was conditioned to a tone, an air puff being the UCS. In Experiment 2, the finger flexion reaction to an unavoidable electric shock was conditioned to a tone. G.S.R. heart rate responses were measured simultaneously. J.C. Brengelmann's finding that the rigidity questionnaire scores were significantly correlated with drive, anxiety, and neuroticism questionnaire method were confirmed. Data suggested that with the G.S.R. and heart rate responses only pseudoconditioning was obtained. Implications of this are discussed.

C. PAYNE, R.W. Overinclusive Thinking in a Depressive and a Control Group. J. Consult. Psychol. 1957. 21, 2, 186-188.

The present results suggest that depressives "overinclude" significantly more than normals on Epstein's test. In fact, depressives are probably more abnormal with respect to 'overinclusion' of thinking than are schizophrenics. MHV was included in the test battery.

RAVEN, J.C. and WALSHAW, J.B. Vocabulary Tests. Brit. J. Med. Psychol. 1944. 20: 185-94.

As vocabulary tests have repeatedly proved to be the most satisfactory means of assessing a person's verbal ability acquired as the result of intellectual activity in the past, we have constructed a scale (the Mill Hill Vocabulary Scale) which as far as we are able to judge, meets the need for a test of this kind as a complement to Progressive Matrices (1938), intentionally designed to record a person's intellectual activity at the time of testing regardless of all previously acquired knowledge.

SHIELDS, J. Monozygotic Twins. London O.U.P. 1962.

This book reports extensive data on twins reared together and apart. Chapter 8 deals with intelligence. The Dominoes Test and MHV were used as nonverbal and verbal measures respectively. The two tests correlated about +.48 over the whole group, being higher in females and Controls, than in males and separated twins. The results suggest that the differences in early environment found in this sample might have had an effect on intelligence but this effect cannot be conclusively demonstrated. The importance for intelligence of heredity is confirmed.

C. VINODA, K.S. Personality Characteristics of Attempted Suicides. Brit. J. Psychiat. 1966. 112. (492) 1143-1150.

A battery of five tests consisting of Mill Hill Vocabulary, Hysteroid-Obsessoid Questionnaire, the Hostility Scales, a level of aspiration-tapping test and Symptom Sign Inventory was administered to a group of 50 female attempted suicides, 50 psychiatric controls and 50 normal controls coming from a general hospital, matched individually on variables such as age, education, occupation and marital status in order to study the personality characteristics of attempted suicides that differentiated them from other psychiatric patients and normals who have not made any such attempts at suicide. Results indicated that attempted suicides had more general

hostility and were more rigid than the psychiatric controls. These differences apart, they were much more like the psychiatric than the normal controls.

WARREN, Neil. Social Class and Construct Systems. An Examination of the Cognitive Structure of Two Social Class Groups. Brit. J. Soc. Clin. Psychol. 1966. 5 (4) 254-263.

Bernstein contends that differences in linguistic coding are associated with social class groupings and primary among consequences claimed for differential linguistic coding are differences in the organisation of cognitive processes. This study attempted to examine the cognitive aspects of Bernstein's theory. A modification of Kelly's repertory grid technique and Mill Hill Vocabulary Scale were administered to groups of middle and working class subjects, very similar in composition to those employed by Bernstein in his own empirical work. Three structural measures of cognitive processes were extracted from the repertory grid data and an interesting incidental finding of class differences in the use of the construct "unusual" is also reported. Results are discussed and various conclusions drawn. It was considered that a measure of support had been provided for certain aspects of Bernstein's theory, with a possibility of further support awaiting clarification of one of the cognitive measures.

6. Other Combinations of RPM and MHV

C. ALLEN, Robert M., and COLLINS, Marjorie G. Suggestions for the Adaptive Administration of Intelligence Tests for those with Cerebral Palsy: Pt. 1. "Administration of the Ammons Full Range Picture Test, Columbia Mental Maturity Test, Raven's Progressive Matrices and Leiter International Performance Scale." Cerebral Palsy Rev. 1955 16: 11-14+25.

Specific suggestions are given for adapting the Ammons Full Range Picture Vocabulary Test, the Columbia Mental Maturity Test, Raven's Progressive Matrices and the Leiter International Performance Scale for use with persons who are cerebral palsied.

ANASTASI, Anne. Psychological Testing. MacMillan, New York. 1961 2nd Ed.

A student's introduction to the CPM, SPM and APM (Ch. 10).

C. ARBLASTER, P.G. and JESSOP, M. Intelligence as a Factor Affecting the Diagnosis of Pulmonary Tuberculosis. Brit. J. of Tuberc. & Diseases of the Chest. 1957, 51, 358-366.

Early diagnosis is especially important in middle aged and elderly males who form the majority of the tuberculosis infector pool. Early doctor consultation probably depends upon certain mental faculties. There is a wide intelligence difference as measured by the Matrices test, between patients with minimal and with extensive pulmonary tuberculosis. This may have a bearing upon early diagnosis and be relevant to case finding methods.

A. BIESHEUVEL, S. (Ed.) Methods for the Measurement of Psychological Performance. International Biological Programme Handbook No. 10. Oxford, Blackwell, 1969.

The handbook is the product of a conference on psychological performance testing held in London in September, 1967. A reviewer states "The final chapter on higher mental processes lists only a few of the tests available. The development of all the tests mentioned, with the exception of the Porteus Maze and the Progressive Matrices, have been done by the contributors in the conference. No special position is taken on higher mental processes.

BURKE, Henry R. Raven's Progressive Matrices: A Review and Critical Evaluation. J. Genet. Psychol. 1958. 93, 199-228.

The evidence indicates that at least Progressive Matrices (1938) has been very widely used, especially in England, clinically and in the British services, but that it could and should be improved, with respect to both reliability and validity, especially for use in important diagnostic decisions about an individual. It is not a substitute in any sense for the Binet or Wechsler tests, nor for any verbal or nonverbal group test of mental ability, but is perhaps an almost equally useful supplement, and shows intercorrelations with such tests as high as they show with one another. The evidence is not unequivocal that it is largely a pure test of Spearman's construct g, even if such a device were possible. It has nevertheless been a useful research tool, especially in the study of the growth and deterioration of mental efficiency. It has special value for use with special groups such as the deaf and spastics. Its value for cross-cultural studies needs to be explored further. The revisions of P.M. (1938), P.M. (1947), Sets A, Ab, B, and P.M. (1947) Sets I and II are still in need of cross-validation research.

BUROS, O.K. (Ed.) The Fourth Mental Measurements Yearbook. Gryphon Press. New Jersey, 1953.

Reviews of CPM, SPM and APM by Charlotte Banks, W.D. Wall and George Westby.

BUROS, O.K. (Ed.) The Fifth Mental Measurements Yearbook. Gryphon Press. New Jersey, 1959.

Literature Summary.

BUROS, O.K. (Ed.) The Sixth Mental Measurements Yearbook. Gryphon Press. New Jersey, 1965.

Review of CPM, SPM and APM by Morton Bortner.

T. BUTCHER, H.J. Human Intelligence: Its Nature and Assessment. London. Methuen, 1968.

An evaluative discussion of Matrices tests in the context of a survey of intelligence tests (Chapter 9).

C. CASHMAN, M.D. and LAWES, T.G.G. A Controlled Trial of 'Gerioptil'. Brit. Med. J. 1961. 1, 554-556.

A small controlled trial has been carried out with six subjects and six controls of the effect of 'Gerioptil H3' on the mental ability, as measured by a number of psychological tests, of patients with senile or arteriosclerotic dementia. The trial has failed to prove that Gerioptil is of any value in this respect.

C. CLAUSEN, Johs. Ability Structure and Subgroups in Mental Retardation. MacMillan & Co., London, 1966.

An extensive battery of psychological tests (including perceptual, psychomotor and cognitive measures) was administered to three groups of mental retardates (C.A. 8-10, 12-15, 20-24) as well as a normal sample (C.A. 8-10). In addition information was gained regarding etiology, E.E.G. abnormalities and neurological signs. Combined CPM and SPM were included in the factor analysed treatment of data and raw scores compared specifically with Porteus' Mazes. Thurstone's PMA was also given. Reported data are composite scores of CPM and SPM so one cannot readily compare with other published values.

T. CRONBACH, Lee J. Essentials of Psychological Testing. Harper and Row. 3rd Ed. 1970.

Description of Matrices tests with discussion of relevant applications. (Ch.8).

DENMARK, F.G.W. An investigation of some problems in the education of partially deaf children. M.A. Thesis University of Liverpool,

The grading of children with defective hearing, the development of electronic hearing aids and methods of determining the hearing capacity of children suffering from partial deafness are discussed. The results of audiometric, mental and attainment surveys of ninety-nine children in a school for the partially deaf are reported. Finally, recommendations are made for the education of partially deaf pupils.

Ninety-nine partially deaf pupils aged 7 to 15 were tested with the Raven's Matrices Test and the Mill Hill/ Crichton Vocabulary scales. Of these one child was found to fall into Grade I, eight children into Grade II, twenty-seven into Grade III, forty into Grade IV, and twenty-three into Grade V on the Raven's Matrices. The mean verbal retardation was approximately five years. The children were also tested on the Schonell Mechanical Arithmetic Test and the Schonell Prose Reading Test (R2). Mean retardations of 2.8 years and 4.0 years respectively were observed on these tests.

Editor: Raven's Intelligence Test. Reply to query. Brit. Med. J. 1947 4506:706. Reply by John C. Raven. Brit. Med. J. 1947 4510:872.

EDITORIAL REPLY:

P.M. is an almost pure 'g' test, but a visuo-spatial or 'k' factor is involved to some extent. Test rather disappointing in practice - reliability, low, susceptible to nonintellectual influences, e.g. age, temporary emotional stress and functions unequally at different ranges of intelligence.

RAVEN's REPLY:

P.M. not intended to be test of "general intelligence". Designed to assess a person's output of intellectual activity at time of testing. Only under certain circumstances does 'k' factor affect results. Test varies in health and illness but not necessarily unreliable as output of intellectual activity not always same. Test does not depend on acquired knowledge and so able to distinguish backwardness due to loss of schooling from genuine mental deficiency. Adult scores decline with age. Tests which don't show this, not necessarily better tests.

C. EISENTHAL, S. and HARFORD, T. Variation in the Form and Administration of Raven's Progressive Matrices Scale in a Neuropsychiatric Population. Psych. Rep. 1969. 24 (1) 262.

Examined two forms of Raven's Progressive Matrices, a five set achromatic form for adults and a three set chromatic form for children. 100 subjects were randomly assigned to one of four conditions. There were 25 subjects per cell in a 2 x 2 design; achromatic vs. chromatic form and individual vs. group administration. Two scores were devised as (1) total number of correct responses to all five sets of matrices and (2) number of correct responses to subtests A & B. Analyses of variance yielded no significant results. Group and individual administration yielded comparable data for Progressive Matrices. Enhancement of performance with chromatic sets of matrices was not demonstrated.

ESTES, B.W., CURTIN, M.E., DeBURGER, R.A. and DENNY, C. Relationships between 1960 Stanford-Binet, 1937 Stanford Binet, W.I.S.C., Raven and Draw-a-Man. J. Consult. Psychol. 1961, 25, 388-391.

The comparability of I.Q.'s from five different intelligence tests was investigated for an above average group of white American children.

C. FEINBERG, I., KORESKI, R.L. and SCHAFFNER, I.R. Sleep Electroencephalographic and Eye Movement Patterns in Patients with Chronic Brain Syndrome. J. Psychiat. Res. 1965. 3. 11-26.

Each chronic brain syndrome (CBS) patient was tested with W.A.I.S., Wechsler Memory Scale and PM (child and adults forms) as well as EEG and eye movement Rank order correlation coefficients were computed between scores on the psychometric measures available for the seven testable CBS patients and several sleep variables. The WAIS verbal, Performance and Full Scale scores and I.Q.'s and the Wechsler Memory Scale and PM scores were not significantly correlated (0.05 level) correlated with total sleep, dream time, % dream time, REM, % REM or with eye movement density values. These negative results cannot be considered conclusive with so small a sample.

FISHER, B. The social and emotional adjustment of children with impaired hearing attending ordinary classes. M.Ed. Dissertation, University of Manchester, 1965.

The adjustment, ability and attainments of 83 children with impaired hearing attending ordinary classes were studied. The children were aged 5.4 to 16.0 years with a mean of 10.1 years. There were 41 boys and 42 girls. A control group of 82 pupils with normal hearing was also tested. Social-emotional adjustment was assessed by means of the Bristol Social Adjustment Guides and the Cattell Personality Questionnaire. The mean Bristol Guide score of the experimental subjects was 11.9, only 47 per cent of the subjects scoring less than 9. No association was found between adjustment score and hearing loss. Mean sten scores of 5.5 and of 4.9 were found on the anxiety and extroversion factors respectively of the Cattell Questionnaire. Non-verbal and verbal abilities were assessed by means of the Raven's Progressive Matrices (Standard or coloured as appropriate to the child) and the Crichton/Mill Hill Vocabulary scales. A normal distribution of scores was found on the Matrices, but on the Crichton/Mill Hill scales both the mean and the median fell between Grades III and IV.

T. FREEMAN, Frank S. Theory and Practice of Psychological Testing. Holt, Rinehart and Winston. 3rd Ed. 1962.

Summarises research on reliability and validity coefficients. (Ch.15).

C.E. GASKILL, P. Tests of Abilities and Attainments. Chapter 9 in EWING, A.W.G. Educational Guidance and the Deaf Child. Manchester University Press, 1957.

Reports the testing of 350 deaf children aged 11-15. 50% were in Grades IV and V, using SPM. A study by Stanton using SPM also found a positively skewed distribution with deaf children. A study by Gaskill using CPM with 289 children aged 5-11 showed a normal distribution.

C.V. HAMILTON, V. and SALMON, P. Psychological Changes in Chronic Schizophrenics Following Differential Activity Programs. J. Ment. Sci. 1962, 108, 455, 505-520.

The investigation reported here attempted to carry out an objective comparison of certain psychological, clinical and social effects following upon Workshop therapy, Occupational therapy and the absence of any specific activity for male chronic schizophrenics. The data obtained showed that while all three conditions led to improvements on the measures employed, the group receiving Workshop therapy improved to the greatest extent.

C. HARFORD, Thomas. An Item Analysis of the Progressive Matrices Test for Samples of Male Schizophrenic Patients. J. Clin. Psychol. 1967, 23 (3) 377-380.

The major conclusion from the study is that the PM cannot be applied indiscriminately to schizophrenic patients since it appears to be of less value for higher socioeconomic groups. The status of the CPM for the State hospital sample is less certain since form Ab was omitted from the testing situation. Further studies are needed to determine the significance of the CPM for this group.

C. HIGASHIMACHI, Wilfred H. The Construct Validity of the Progressive Matrices as a Measure of Super Ego Strength in Juvenile Delinquents. J. Consult. Psychol. 1963. 27: 413-9.

Raven's P.M. (1938 and 1947) were used to determine their sensitivity in reflecting differences in super-ego strength and functioning. Postulated that high score on Matrices is associated with measure of strong super-ego on Picture Arrangement Test (PAT) and low score on Matrices with measure of weak super-ego on PAT when general ability was kept constant. Twelve delinquent boys composed strong super-ego group and 12 the weaker super-ego group. Combined Matrices scores showed strong super-ego group had a significantly higher score beyond .01 level of confidence than weak super-ego group. Results supported fact that Matrices are sensitive in reflecting differences in super-ego strength and functioning in population of delinquent boys.

C. IRVING, G., ROBINSON, R.A. and MACADAM, W. The Validity of Some Cognitive Tests in the Diagnosis of Dementia. Brit. J. Psychiat. 1970. 117. 537. 149-156.

The validity of a number of cognitive tests (including PM and Mill Hill Vocab.) in discriminating between brain-damaged and non-brain-damaged elderly patients has been assessed against the criteria of psychiatric diagnoses and EEG classification. The association between these criteria and test classification is shown for two separate samples of approximately consecutive admissions. Several of the measures would appear to affect this differentiation at levels high enough to warrant their clinical application. Although the organic group was older than the functional this does not appear to have had any significant effect on the validity of the test measures in discriminating between the diagnostic groups.

A.E. JENSEN, A.R. and ROWHER, W.D. An Experimental Analysis of Learned Abilities in Culturally Disadvantaged Children. Report, Office of Economic Opportunity. 1970.

This report includes several studies involving CPM and SPM which are taken to epitomise the author's concept of "Level II intelligence" which "is characterised by the transformation and manipulation of the stimulus prior to making the response. It is the set of mechanisms which make generalisation possible". Comparisons among different groups using a variety of intelligence and memory tests point to socioeconomic status as a major variable in PM performance. Racial differences between Negro and white children were also clear in the subjects studied. "The hypothesis that the white-Negro differences is mainly attributable to culture bias, in the sense in which it is defined here ... is not supported by these data".

C. KENDRICK, D.C., PARBOOSINGH, R.C. and POST, F. A Synonym Learning Test for Use with Elderly Psychiatric Subjects: A Validation Study. Brit. J. Soc. Clin. Psychol. 1965. 4. 63-71.

In the course of the development of the Synonym Learning Test (SLT) groups of elderly patients were given a battery of tests. This included MHV and CPM and it was noted that "the brain damaged group is clearly differentiated from the depressed groups of CPM. MHV (Synonyms) gave a better estimate of premorbid level of intelligence in brain damaged subjects than of the other intelligence tests.

C. KIDD, Cecil B. Criteria for Admission of the Elderly to Geriatric and Psychiatric Units. J. Ment. Sci. 1962. 108, 452, 68-74.

A method of assessing physical and psychological disturbances in old people admitted to geriatric or mental hospitals is described. A sample of admissions aged 60 years and over to Wakehurst House (geriatric) and Purdysburn Hospital (mental) were so assessed.

A.N. MACARTHUR, R.S. Mackenzie District Norming Project. Dept. of Northern Affairs and National Resources. Ottawa, 1965.

Report gives 4 sets of stanine norms for pupils of the Mackenzie District of the Canadian Northwest Territories for a group of tests, including CPM and SPM. Pupils were Eskimo Indian-Metis and White and norms are given for each group, as well as for the total.

A.E. MACARTHUR, R.S. Assessing Intellectual Potential of Native Canadian Pupils: A Summary. Alberta J. Educ. Res. 1968. 14, 2, 115-122.

This article summarizes evidence of the construct validity of several "culture-reduced" measures of intelligence, including PM. Evidence suggests that, until research can improve on these tests, such culture-reduced measures of general intellectual ability as PM, SCRIT, IPAT Cattell, and Lorge-Thorndike Non-verbal should be included in testing programmes for individual native Canadian pupils.

Reasons:

1. Items form something of an age scale, sampling stages in the development of human cognition.
2. The tests use as stimuli symbols which, though dependent on learning are likely to be learned in a variety of cultures.
3. Arrangement of items in the test itself forms a crudely-programmed sample of learning-on-the-spot.

These 3 characteristics suggest directions for further research. An additional conclusion is that large proportions of Canadian native pupils of early school

age have the general intellectual ability necessary for participating fully in the larger Canadian community.

A.E. MACARTHUR, R.S. and ELLEY, W.B. The Reduction of Socio-Economic Bias in Intelligence Testing. Brit. J. Ed. Psychol. 1963, 33, 107-19.

Study was designed to investigate extent of socio-economic bias in selected intelligence tests (to better estimate intellectual potential of students from deprived cultural and education backgrounds). Nine culture-reduced tests and subtests were administered to a representative Edmonton sample of 271 12 and 13 year old children and results analysed in relation to measures of socioeconomic status, verbal intelligence, achievement and school marks. City wide testing surveys conducted during previous four years provided data on children for longitudinal comparisons. Results supported hypothesis that it is possible to measure a broad component of intellectual ability with significantly less cultural bias than is found in conventional Lorge-Thorndike Figure Analogies Subtests.

A. MAISTRIAUX, R. L'intelligence Noire et Son Destin. Problemes d'Afrique Centrale 1955. 30, 255-285.

Discusses errors made by adult Africans and White Belgian retarded children. Errors from various groups show similarity in spite of differences of race and level of civilisation.

MILLER, F.M. and RAVEN, J.C. The influence of Positional Factors on the Choice of Answers to Perceptual Intelligence Tests. Brit. J. Med. Psychol. 1939. 18: 44-52.

Test consisted of an incomplete matrix of relations. 6 or 8 alternatives were arranged below the matrix, one of which had to be selected as completing the pattern. If the problem was of moderate difficulty, the position of the correct alternative made little difference in the percentage of correct solutions, but favourite positions were apparent if the problem was too difficult for subject. In that case, correct results were obtained by chance if the right answer was in a favoured position. (This is one of the original papers describing the development of the Progressive Matrices.)

A. MISITI, R. Presentazione del reattivo "Progressive Matrices" (adulti e fanciulli) di J.C. Raven. (Introducing the "Progressive Matrices" test (for adults and children) of J.C. Raven). Recerca Scientifica 1954, 24, 5. 1052-1058.

The author introduces the "Progressive Matrices" both in the form for adults and in that for children. discussing particularly its general characteristics, scopes and classification, its history, stimulus characteristics, elaboration, interpretation, practical applications and results. There follow some critical remarks, twenty five bibliographical references, and an appendix illustrating the instructions for the administration of the test. (Text in Italian, summaries in French, English and German.)

A.H. MONTAGUD, Rafael Ferrandis. Baremos del colegio nuestra Senora de Loreto. Revista de Psicologia General y Aplicada 1969, 24, 789-797.

Present norms for students at this college from the years 1963-1969 for the following tests: SPM, CPM, Goodenough's intelligence test for children and Anstey's Dominoes Test.

C. ORME, J.W. Nonverbal and Verbal Performance in Normal Old Age, Senile Dementia and Elderly Depression. J. Gerontol. 1957, 12: 408-13.

Two independent tests of nonverbal (PM) and verbal (Mill Hill Vocabulary Scale) performance, standardized to age 65, were administered individually to selected groups of 51 healthy old people, 24 elderly depressives and 25 persons with senile dementia. Results suggest that in all old people, particularly those with senile dementia, may be a function fluctuation of intellectual ability. Depression in old age does not seem to manifest any disturbance of non-verbal and verbal performance compared with normal old people of approximately same age rante. Decline with age of verbal performances seems to be important in senile dementia group, distinguishing them from the two groups of subjects above. So in senile dementia it would seem to be important to assess verbal deterioration as well as non-verbal deterioration.

N. ORME, J.E. Hypothetically True Norms for the Progressive Matrices Tests. Human Development. 1966. 9. 222-230.

This paper examines the published norms of Standard and Coloured Progressive Matrices. It is argued that both the decline of ability in adult life and its increase in childhood, appear to be linear and of same order for all levels of ability. It is therefore possible to calculate "hypothetically true" norms. Apart from advantages of such a procedure, its feasibility supports the view that ability to solve Matrices type problems is a fundamental psychological process.

C. PINKERTON, P. and KELLY, J. An Attempted Correlation between Clinical and Psychometric Findings in Senile Arteriosclerotic Dementia. J. Ment. Sci. 1952. 98. 244-255.

This paper presents a method which combines quantitative and qualitative data (uses CPM and MHV) and attempts to relate emotional reaction of the patient to his deterioration. Method has been applied to 40 senile arteriosclerotic patients treated in a mental hospital. It is shown that, while the loss of ability to abstract determines the level of problem difficulty which the patient can master, his total efficiency depends not only on this loss but also on the emotional reaction to it. The results of the senile group were compared with those of children.

C. QUALTERE, Thomas J. An Investigation of the Relationship Between Visual Figure-Background Disturbance and Performance on Raven's Progressive Matrices Test in Cerebral Palsy Children. Doctor's thesis. Syracuse University, 1957.

Purpose was to investigate relationship between visual figure background disturbance and performance on PM in cerebral palsy children. Subjects were 64 cerebral palsy children aged 6-15 years and divided into 32 spastic and 32 athetoid with 16 mild and 16 moderate cases in each. Each child given Stanford-Binet (L) & Ammons Test (to determine amount of visual figure background disturbance), Raven Colour Test and Raven Black and White Test. Significant differences found between performance on Raven's tests for all cerebral palsy children with visual figure-background disturbance. Those without this disturbance appeared to do significantly better on Raven's Black & White Test. Athetoid group better than spastics on both Raven's tests. Children with mild degree of handicap had better results than those with moderate handicap.

RAVEN, J.C. The R.E.C.I. Series of Perceptual Tests: An Experimental Survey. Brit. J. Med. Psychol. 1939. 18: 16-34.

A series of perceptual tests were given to children between ages of 4 & 14 in a small urban area and also to other selected groups of subjects. So possible to cover practically whole range of mental development from 2-1/2 to 14 years. Norms and standard deviations were computed and an analysis of component tests made. Causes of erroneous responses have been studied. Subjects whose scores were more than twice standard deviation above or below normal could not be differentiated. Insufficient data was obtained for conclusions to be drawn concerning subjects over 14 years. Scores of adults tested suggested that series would differentiate subjects over age of 14 into five classes, according to whether a subject was mentally defective, dull, normal, bright or of University standing, but would fail to differentiate between individuals within these groups. A revised series has been prepared on basis of this survey. (This is one of the original papers describing the early development of Progressive Matrices.)

RAVEN, J.C. Matrix Tests. Mental Health. 1940. 1: 10-8.

C. RAVEN, J.C. Psychological principles appropriate to social and clinical problems. H.K. Lewis, London, 1966.

The first section describes the practical problems involved in interviewing children and adults in the assessment of their verbal statements and in the uses and limitations of questionnaires and mental tests. Second and longer section deals with theoretical principles. Personality and individuality are discussed in terms of 4 questions = variables and co-ordinates of every interview - that must be answered by the psychologist "in order to assess a person's ability to adapt to his surroundings so that he achieves what he wants to do in harmony with other people ...". Briefly these questions are (1) "How does a person's attention vary with time in its location, range and concentration? (2) Does his behaviour show well-defined intentions with respect to the past and future? (3) What does he enjoy as good or fear as evil? (4) How does he order his thinking with respect to himself and his surroundings?" Through these variables, "the psychologist is able to demonstrate characteristic differences in the things people say or do". The extent to which these"variables are to be assessed is shown and problems requiring future research are indicated.

C. REDA, G.C. I Tests di Efficienza Intellettiva. Lavoro Neuropsich. 1951. 9. 1-2. 77-97.

A review in Italian of available tests of intelligence, including discussion of MHV, SPM and CPM. Particular attention is given to the use of such tests for the identification of deterioration.

A.N. REDA, G.C., NENCINI, R. and RICCIO, D. Contributo alla Taratura Italiana del Progressive Matrices 1937 e 1938 di J.C. Raven. Bolletino de Psicologia Applicata. 1955. 7-8, 15-23.

Norms for Italians are presented for children on the CPM based on results from 214 children aged 7-11. Norms on SPM are presented based on 400 subjects aged 16-89 and the effects of age, especially after 60, are demonstrated. (Text in Italian.)

A. SINHA, Uma. The Use of Raven's Progressive Matrices Test in India. Indian Educl. Review 1968. 3 (1) 75-88.

Studies with PM in India are reviewed to show that the Matrices have been used for predicting achievement, measuring intelligence and for general psychometric interests. However, no study with regard to the validity of the tests in India has so far been recorded. Some results showing that engineering and architecture students do relatively better on this test indicate that the test is probably loaded with factors like K, which are likely to be more developed in engineering students. The tests correlate moderately with other verbal and non-verbal tests of intelligence used in India. The norms developed in different parts of India have to be interpreted properly, and a study of the validity of the tests is necessary.

VAN DAM, F. Some Contributions to the error and scatter Analysis of PM 38 and CPM 47 tests - A Critical Survey Emphasising Sets A & B. Unpublished manuscript. Brussels, 1971.

A historical survey of item analysis and scatter analysis of the Matrices tests, reviewing work up to 1971, including work published in French.

E. VENABLES, Ethel C. Social Differences Among Day Release Students in Relation to their recruitment and examination Success. Brit. J. Social and Clin. Psychol. 1963, 2: 138-52.

From a large scale and long term survey of the abilities of young technical college students, it is argued that failure in part time day classes can best be understood in relation to their heterogeneous nature and the differential motivations obtaining among the students. Youths from non-professional families fared at least as

well as those from professional backgrounds. This and other findings and possibilities are discussed in terms of the social class structure of the students.

T. VERNON, P.E. Intelligence and Attainment Tests. Philosophical Library, New York, 1960.

Gives some general details about Progressive Matrices in the section on non-verbal tests. By age 50, the average adult has dropped back to the same level as 10 year old children on the Matrices.

A. WEST, L.W. and MACARTHUR, R.S. Intelligence Tests for Two Samples of Metis and Indian Children. Alberta J. of Educ. Res. 1964. 10. 1. 17-27.

Purpose of study was to investigate a selection of culture reduced intelligence tests and to identify those which for two samples of Metis and Indian children at four grade levels, show a minimum of cultural bias. A battery of tests was given to 126 Metis children at the Faust school and an identical battery was given to 155 Indian and Metis children, at the Fort Simpson school. Relative extent of cultural bias in the tests was determined by comparing the means of the derived scores on the tests. Culture-reduced tests show (1) significantly less cultural bias than more conventional tests (2) substantial correlations with academic achievements (3) substantial correlations with other more conventional measures of intelligence and therefore they possess concurrent validity. The tests, were evaluated against four criteria, those tests which show greatest promise at each level for cross cultural assessment of intellectual ability have been identified. Progressive Matrices is recommended at all levels.

YATES, Aubrey J. The Use of Vocabulary in the Measurement of Intellectual Deterioration - a Review. J. Ment. Sci. 1956. 102, 428, 409-440.

A detailed and critical review of the use of vocabulary tests to measure intellectual deterioration. Discusses Mill Hill Vocabulary and Matrices.

Author's Note

It will be noted that this bibliography is compiled from a wide variety of international sources. Every effort has been made to provide an adequate synopsis to guide those who wish to work with RPM. However, some titles lack synopses due to translation problems and others reflect varying degrees of fluency which could be improved by those with appropriate language skills. Improvements will be welcomed for inclusion in a revised bibliography.

In some instances, the original article has proved unobtainable in Australia and hence only the title is given. If others have access to articles which have no summary but are in English, a copy of these would be most welcome to make this work more complete.

Most abstracts are based directly on the original work modified in some instances to draw attention to the use of RPM or MHV in the work.

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